

State of Kuwait
Series of Publications of
Islamic Organization For Medical Sciences
Islam and Recent Medical Problems

Islamic Medicine: Its Prospects

(53)

Supervised by
Dr. Abdul Rahman A.Al-Awadi,
President,
Islamic Organization
for Medical Sciences, (IOMS)
Kuwait

Edited by
Dr. Ahmad Rajai El-Gindy,
Secretary General Assistant, IOMS
Dr. Mokhtar M. Bishr
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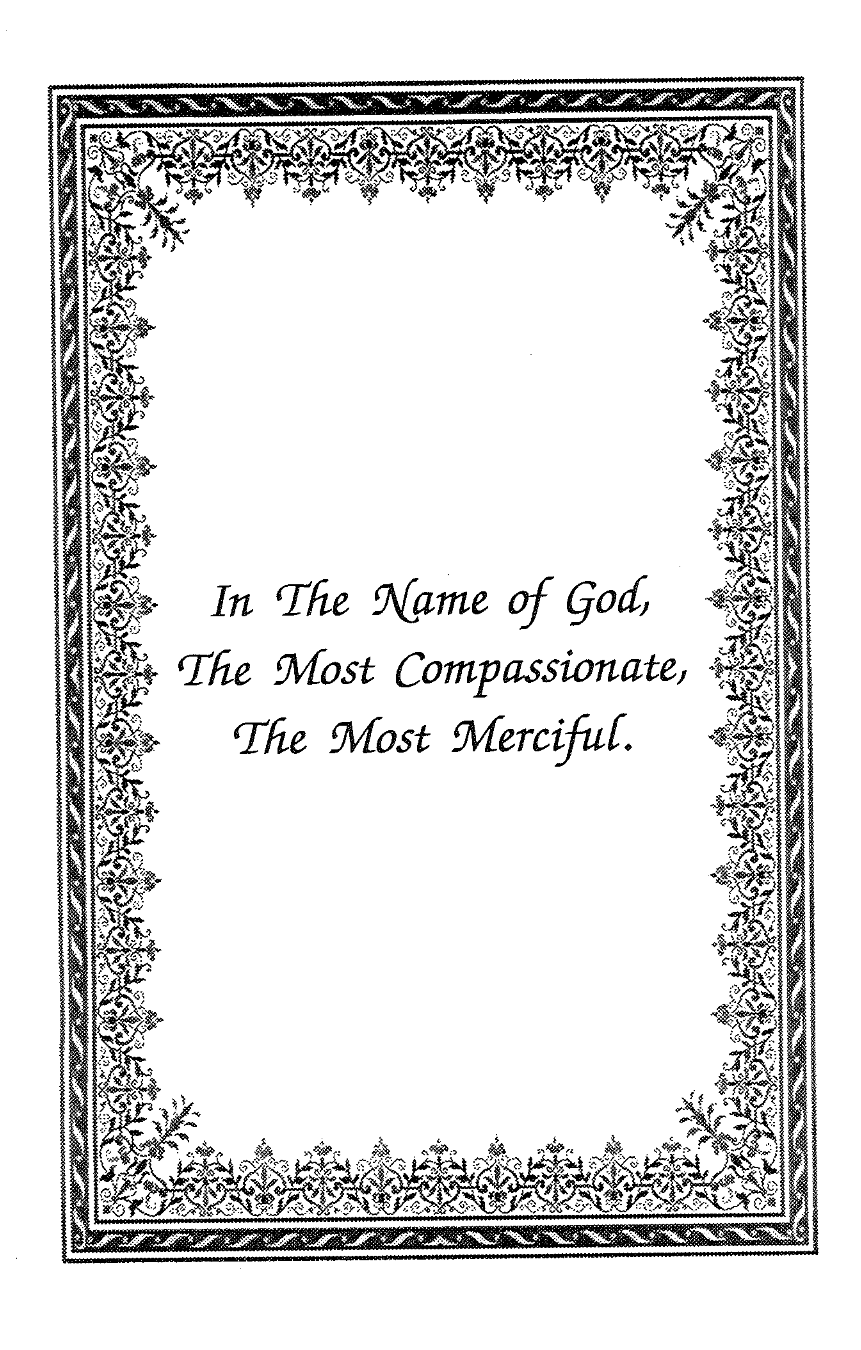
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In The Name of God,
The Most Compassionate,
The Most Merciful.

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PREFACE

Dr. Abdul-Rahman A. Al-Awadi
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KUWAIT

Thanks to Allah Almighty for guiding us to Islam, enlightening our hearts with true belief, discarding all grief, dispelled worries, and freed our homeland.

This series comes following fifteen years of the idea of establishing the Islamic Organization for Medical Sciences and after its participation in local and regional book exhibitions where our volumes of Islamic Medicine were greatly appreciated by the visitors. However, because of the soaring cost of paper and publication, the individual book keeping has become very difficult, especially in the non-Gulf Arabic and Islamic countries, as bread earning receives the first priority of the inhabitants of these countries. Keeping in view the fact that the individuals need to be informed, and educated, of the important matter to make them effective member of their community and also a messenger to other communities, it is vital to provide them the contents of these conferences in a simplified way to enable them to carry along and comprehend the scientific purport.

In order to facilitate the possession of these books by the individuals, the Islamic Organization for Medical Sciences has decided to issue a series of publications under the title "The Cultural Series of the Islamic Organization for Medical Sciences". Although the Organization is shouldering the largest share of the cost of production and publication of these books, still these are out of reach of a large section of Muslim individuals, due to escalating cost of living. The great sum of money available to the Organization is spent

in bringing together and collecting the prominent thinkers of our Islamic nation in order to achieve appropriate opinions and covisions of the Islamic Scientists about right topics that need insight and the true objective word. And, subsequently, to present this information to every individual willing to increase his/her knowledge about the doctrinal writings in scientific medicine, as this prominent group of writers/thinkers sees this as an ordinance and a religious obligation to provide for all the Muslims, and to disseminate the message to the largest number of the people of this nation.

This series will include a group of books, each dealing with specific topic, as collected from the articles written under the respective domains and previously published in the Proceedings of the Islamic Medicine Conferences held under the auspices of the Organization. Moreover, all these publications shall remain concerned with one vital topic, that is, the Islamic Medicine. By doing so, we hope to have shouldered the burden off the Arabic/Islamic reader to enable him/her to own the right material and hoping to have clarified a lot of mystery about the subject of Islamic Medicine to the Muslim and Arab readers.

Herein, I beseech Allah to guide our steps to what He likes and approves of.

INTRODUCTION

Dr. Ahmad Rajai El-Gindy
Secretary General Assistant
Islamic Organization for Medical Sciences,
KUWAIT

Thanks to Allah, the Almighty; the thanks of the grateful, the obedient, and the desirous of His forgiveness and retribution, beseeching him, to guide us to the right deeds, with praying and blessing his illiterate prophet (ﷺ) who said,

"When Adam's son dies, everything is separated from him except for three things, a current charitable deed, a righteous boy praying for him, and a useful science."

We pray to Allah that these series of publications will be of scientific use to the Muslims in particular, and to humanity in general.

This introduction will be included in all the publications of this series in order to acquaint the reader, who wishes to acquire one or more parts of it, with the objectives of the Organization, and the reasons behind its being established. We wanted to put down these words to the readers concerned about what we did, while the second part of this introduction will be specifically written for each book, including a summary of the researches therein.

Since the emergence of the idea of the Islamic Medicine fifteen years ago, the discussion of the meaning of "ISLAMIC MEDICINE" did not stop; the people argued: Is there an "Islamic" and "a non-Islamic" Medicine? and we found ourselves in front of three opinions:-

The first opinion:-Medicine is a human heritage; inherited successively by generations, and it is a human experience, acquired by technical and scientific practice, and religion has no role in it, and

there is no need to indulge Islam in this subject to protect it from human practices.

The second opinion:- Islamic medicine means nothing to them except it is a past heritage, and we do not need it now because the world is talking about organs transplantation, genetic engineering, Lazer beams... etc. They even considered it a call of underdevelopment, and we have to put it behind closed doors; those are who don't want Islam to be mentioned at all.

The third opinion:- Although medicine is human practices and experiences, but every religion and every heavenly message has its own nature, ethics and practices which are derived from its teachings, and which adds to it its own style. The Islamic era was characterized with a comprehensive change in both the concepts and practices of the people; these concepts and practices were derived from the Holy Quran and the honored Sunna, and were followed by the Orthodox Caliphs, which produced a good harvest, with which they ruled the world, east and west with a civilization - Man was its master, good science its way and the strong belief its pillars. This civilization lasted for five complete centuries, and it was never stingy with its knowledge and arts on humanity.

For there is no favor of an Arab on a Persian, nor of a white man on a black man except by piety and good deeds, this was said by the enemies before the friends; and (Sarton's) testimony in his encyclopedia, the history of sciences, is the best evidence; (Sarton) divided the world into eras of civilizations like the Pharonic, the Babylonian, the Somarian, the Chinese, the Greek, then the Islamic Civilization which flourished in all walks of Arts and Sciences for five consecutive centuries, and in it were eminent scientists, thinkers, philosophers, physicians, pharmacists, engineers, Algebra's, Astronomers, Agriculturists, and people of thoughts who were distinguished with their excellence in the Divine Law, besides the cosmetic sciences.

To all these we say, our view of this topic is derived from Islamic Law, which came with its five goals, which are sustaining the religion, the mind, the self, the honor and the wealth. If we studied these goals, we'll find that three of them are concerned with Man's well being; that is the mind, the self and the honor, as for the other two, they are concerned with man's health, as there is no keeping of religion, nor of wealth without a strong good Muslim (The best one to hire is the strong and honorable). The prophet (ﷺ) defined three main points, if provided in any MAN, he will lead a very happy life, as he (ﷺ) says

"The one who sleeps secured in his bed, healthy in body, well provided for his day's food, ... he is like the one who owned the entire world."

In other words, he has got social, health and psychological security. Thus the Islamic Law talks about well being in its widest range. "The strong believer is more loved by Allah than the weak one, and both are good." The Islamic Law did not speak about medicine in its narrow sense, through which the others are trying to attack us, but medicine is the means of health, and Al-Ghazaly, a Muslim religious leader, considered medicine as a religious ordinance in all Muslim homes.

Islam considers enjoying a good health one of the biggest blessings of Allah; as mentioned in the wise saying of the prophet (ﷺ), "*Two blessings many people are not endowed with; health and leisure time*". These two blessings are two of the very important duties that must be kept by man as the Islamic rule says, "Whatever is not perfect without a duty, is itself a duty", thus man is not allowed to neglect his health, as it should not be neglected, because this is considered an aggression on the whole nation as it is so mentioned in the Holy Quran:-

"FOR THAT ACCOUNT WE ORDAINED FOR THE CHILDREN OF ISRAEL THAT IF ANY ONE SLEW A PERSON - UNLESS IT BE FOR MURDER OR FOR SPREADING MISCHIEF

IN THE LAND - IT WOULD BE AS IF HE SLEW THE WHOLE PEOPLE, AND IF ANY ONE SAVED A LIFE, IT WOULD BE AS IF HE SAVED THE LIFE OF THE WHOLE PEOPLE"

(Al-Maeeda: 32).

Abu-Bakr, (رضي الله عنه) said "I heard the prophet of Allah (ﷺ), saying, *"Ask Allah for certainty and health, for they are the best blessings bestowed on man is being healthy after being certain"*; thus self-relief is the true gate to health; either psychological or bodily health, their only true gate is strong belief, belief in slavery to Allah, whatever inflicts you was not to wrong you, and whatever to wrong you, was not to inflict you.

The belief in the acts of worship which are prescribed by Islam are:-

Prayer is secret talk with Allah Almighty, and self purification five times a day standing in front of the Creator,

Fasting is self restrain from evil desires, and true feeling of the hunger of the Muslim brother who is deprived of a morsel of bread,

Zakat or *Alms* is a sacrifice, self cleanliness, and development,

Haj is a migration to Allah and his prophet, (ﷺ), leaving everything - power, wealth, prosperity and living in complete humbleness and slavery, equal with your kin Muslim... as it is said; "No Arabic is better than a non-Arabic, nor a white is better than a black man except by piety", and these acts of worship protects and restrains man from evil doings, thus leaving them will lead to the spread of evil deeds and man will gain nothing but punishment for what he had done.

In order to complete the building of man and society, and to achieve the goals of Islamic Law, the doctrines of lawful and unlawful were put down to guide man to the right road and bestow happiness on him; as in the lawful deeds man will find his happiness, and in unlawful deeds he will be perished; thus the prohibition of drinking alcoholic drinks, and all ways leading to it, as prescribed by Allah was for the protection of

man's mind and body, the society from diseases and the consequences of the absence of his mind, the prohibition of adultery, and all ways leading to it, wanton display of beauty, solitude with a woman, and libertinism... etc, was prescribed to protect the family and the whole society from dissociation and mixing of lineage which destroy the society, thus the philosophy of prohibition in Islam is meant for the prevention of harms to man himself and to others as well.

Thus, it is clear that the goals of Islamic Law (Sharia) can not be achieved without good health and well being, as Abu-Al-Dardaa said to the prophet, (ﷺ), "To be healthy and grateful, is much more better than to be ill and endure patiently", the prophet (ﷺ) answered him by saying, *"Allah loves healthy people, as you do"*.

That is not all, but Islam's view of the sick and sickness has overrun all that preceded it and whatever followed from laws or social systems, as Islam does not see sickness as an anger of Allah, or a touch of the devil, but a trial, and the Muslim has to be patient and bear it with patience as the Prophet (ﷺ) said,

"Any kind of sadness or grief or even the prick of a thorn that inflicts man is a blessing from Allah as He raises him a degree higher or takes from his bad deeds instead".

The Holy Quran came to the world with statements about the inner self, this was fourteen centuries ago, and it put to it four marvelous divisions in various parts of the Holy Quran, thus the world knew about the peaceful innersoul, the lamenting innersoul, and the authoritative innersoul. Abu-Hamid Al-Ghazally, has delved deep in the inner-self in his encyclopedia "The Revival of religious sciences", under the heading" Fear and Request", as the Holy Quran talked about the ailments of the heart, and their different kinds, as it was mentioned by Imam Al-Zahaby in his book "The Prophetic Medicine".

As for the medicine of the heart, it is only found in the sayings of the benevolent and kind Prophet (ﷺ), when he quoted Allah, the only

source of all knowledge, he says that for the hearts to be righteous, it must know its creator, His names, characteristics, deeds, orders, and prohibitions and anger, as there is no way of being righteous except by doing this, and no way of getting these advice except from Mohammed (ﷺ).

Imam Ibn Kerium Al-Jozeiah has divided the hearts into two divisions: suspicion and doubt, and desire and error. He quoted the Holy Quran as saying,

"IN THEIR HEARTS IS A DISEASE; AND GOD HAS INCREASED THEIR DISEASE".

(Al-Baqarah: 10), and:

"O CONSORTS OF THE PROPHET! YE ARE NOT LIKE ANY OF THE OTHER WOMEN: IF YE DO FEAR (GOD), BE NOT TOO COMPLAISANT OF SPEECH, LEST ONE IN WHOSE HEART IS A DISEASE SHOULD BE MOVED WITH DESIRE"

(Al-Ahzaab: 32).

The Quran described the inner-self when horrified or frightened, and how to make it peaceful again in His very simple and clear words:

"TRULY MAN WAS CREATED VERY IMPATIENT; FRETFUL WHEN EVIL TOUCHES HIM; AND NIGGARDLY WHEN GOOD REACHES HIM; NOT SO THOSE DEVOTED TO PRAYER: THOSE WHO REMAIN STEADFAST TO THEIR PRAYER; AND THOSE WHOSE WEALTH IS A RECOGNIZED RIGHT FOR THE NEEDY WHO ASKS AND HIM WHO IS DEPRIVED (FOR SOME REASON FROM ASKING) AND THOSE WHO HOLD TO THE TRUTH OF THE DAY OF JUDGMENT; AND THOSE WHO FEAR THE DISPLEASURE OF THEIR LORD, FOR THEIR LORD'S DISPLEASURE IS THE OPPOSITE OF PEACE AND TRANQUILLITY."

[Al-Maarij: 19-28].

This is how Islam considers health, which was defined by the prince of Islamic physicians: Ibn-Sina by saying: "Medicine is the science by which the human body is known, and what is good and what

is not for being healthy or otherwise." This comprehensive definition which was introduced more than one thousand years ago, is nowadays adopted by the WHO, that health is the state of the healthy body, mind and society, not only the lack of diseases or inability.

In spite of this definition of the WHO, during the forties, it ignored the spiritual side, which shows the lack of a comprehensive view of Islam about health, as Islam defines health from all domains, bodily, spiritually, psychologically and socially, and this last definition came 14 centuries ago, by the Muslim physicians.

To reach these noble goals, and great objectives for the Lord's heir on earth, there had to be a way to keep man healthy, and this is by the science of medication which was considered by the Muslim religious scientists an ordinance in the Islamic world, and Imam Al-Shafeiy said about it; "There is no knowledge, better than the prohibited, and non-prohibited acts, to my knowledge, except the science of medication". Dawood Al-Antaky in the introduction to his famous prescription says that there is no science that can do without the science of medication, because no acquisition of any knowledge is perfected without a sound body, senses, and mind.

Islam has taken good care of the different branches of medication; protective, preventive, an rehabilitative; in the protective, many sayings of the prophet (ﷺ), called for protection, in order to keep health in all its branches - cleanliness, food organization, and many healthy habits, as well, the researches in this domain is varied and all are derived from the prophet's (ﷺ) wise sayings, no need to repeat them here.

As for the treatment side Islam legalized medication, and the prophet (ﷺ) ordered medication and looking for it when he (ﷺ) said:

> *"Ye believers, get treatment, the Lord created no disease without its medicine, known to those who know and ignorance to those who don't know".*

As for rehabilitation, we are asked to look for it, he allowed one of his disciples to put a piece of gold on his lost nose during his invasions.

As for the three opinions pre-mentioned concerning the definition:-

To the first group we say: Medication is a human heritage and contribution, but the human thinking has deviated from the right path, and religion is in the church and in the mosque or the temple, due to their sufferings from the control of the church over medication and sciences, and making them only for the priests, medication did not develop, and the ship of science sank deep with its arsenal of destruction, thus they produced the microbial bombs, and medication turned into fatal poison; instead of relieving pains, and becoming a tool of the Lord's benevolence, it became devastatingly harmful, and the brother became keen on eliminating his human brother, and the call for killing substituted the call for mercy, the organs began to be sold, and man was transferred from the master of earth to a sample in labs, and source of trade .... etc. the list is endless.

The best evidence to be quoted here is the saying of Abenhaimar; the father of the atomic bomb, when he saw it explode in Hiroshima from a distance, he said his famous words: "Now, and now only, science has sinned".

As for the second group: which said "Islamic medicine is nothing but an ancient memory and a call for underdevelopment.." we say to them that the heritage of any nation is like the roots of a tree, whenever it goes deeper and deeper in history, it becomes firmer and firmer and provides it with the means of living; the invention of genetic engineering, the nuclear bomb, and organ transplantation are not only signs of civilization, but they are the leaves of the tree and its fruits, as civilization is much more wider than that, and cares less with its achievements, but cares more for the achiever, MAN, and cares for the philosophy of his existence in this world and the hereafter, as well as his ethics and culture.. if he is separated from these, he will be lost for

ever. Now although the western man enjoys the highest per capita, and has got every means of prosperity, we find the percentage of suicide going up and up, as well as the addiction of narcotics, drugs... etc. became a daily practice; to enable him to forget and escape from his worries... the western man neglected the spiritual side of feeding his inner-self, and instead tried to feed on earth's food, thus he failed, and was transferred to a cog in a big machine.

This is not only in the west, but it is now prevalent in the east, as well; family relations are severed, social relations collapsed, man changed into a wild beast in a jungle full of fierce animals, each is trying to eat the other. I don't want to say more, it is enough to remind you with the AIDS that is harvesting man's bodies... Nevertheless, no body talks about chastity, virtue or ethics.. but they began to distribute contraceptives, for males and females, as if saying "Do it however, and whenever you want..! but use these contraceptives to protect you from the AIDS..!" Is this the Islamic way or attitude towards the man, whom it honored and asked to walk and learn and enjoy the fruits of life. Man asks, as many asked before about health and happiness, in spite of his materialistic progress and scientific development in all fields of medicine and protective treatments.

Islam gave due attention to man's environment, and warned him against corruption and doing mischief, as both affect his health, the Lord's words describe what happened all over world from corrupting the environment, which threatens man's life as He said' "CORRUPTION HAS APPEARED ON LAND AND IN SEA ON THE HANDS OF MAN, TO MAKE HIM TASTE SOME OF HIS DOINGS, HOPING HE MIGHT RETURN TO RIGHTEOUSNESS", and He orders us not to do mischief by saying, "DON'T CORRUPT THE EARTH AFTER IT HAS BEEN RECLAIMED." Corruption here, I believe is both materialistic and ethical; as material corruption includes mischief on earth and around it, and ethical corruption means self and moral corruption.

To add to all these views that each civilization has its characteristics, its features, its morals, and its practices, Islam is unique in this, as Islam sees man as a whole, body and soul in full balance, none overweighs the other, as he did not worship the material, nor invented priesthood. Islam has taken care of man before he was born, when choosing a wife or a husband, at marriage, when he was a sperm drop, a baby, young, and old, Islam put to him a very accurate disciple system of life, taught him how to eat, drink, dress, treat himself, his Lord, his family, and his community. Islam has put to him goals in life - as it is a farm for the hereafter, to harvest from what his hands grew, and Islam was able to introduce a civilization to the world, with which Europe progressed from its dark ages with the help of the Islamic doctrines, but the Muslims slackened down and left Europe to lead the ship of scientific development. It may be that our interest in calling medicine by the Islamic Medicine, came as a symbol to awaken the Islamic world, and tell them that there is a lot in Islam in all fields; economics, architecture, arts, cosmetic, medical... etc. and their commitment to Islam will bear fruits, too. One objective of choosing this name to medicine is the human deviations in practicing medicine in the West, but the East has to have a loud voice to awaken it and shake it; that is the voice of Islam, by providing the right opinion in these practices, especially when we lost the lead of materialistic science, but we can still provide it with what purifies them and saves them from deviation, this is by means of the enlightened Islamic views. Moreover, the communication revolution has made the world a small village, knowing what happens all over it by the second... these developments are knocking our doors, thus we must be aware of it and give the Islamic view point in it, showing the advantage of Islam which differentiates between what is right from what is not.

The Lord knows what the inner-self whispers, as He is nearer to him than his vein, and He is the maker of his inner-self, and He directed him to his success, as He says'

"BY THE SOUL, AND THE PROPORTION AND ORDER GIVEN TO IT. AND ITS ENLIGHTENMENT AS TO ITS WRONG AND ITS RIGHT. TRULY HE SUCCEEDS THAT PURIFIES IT, AND HE FAILS THAT CORRUPTS IT".

(Al-Shams: 7).

The Almighty knows what the corrupt eye sees and what is hidden in the hearts.

Some people suggested that we call it THE ARABIC MEDICINE, in order not to distort the picture of Islam, as a result of misdemeanor of some practitioners, but this name might lead to the understanding of the use of medicinal plants and ancient medication practices, and this has its shortages, as well as its advantages, too, and because most of those who enriched the Islamic movement were not from the Arabic environment, like Al-Razy - from Al-Rey, Ibn-Sina - from Russia, and Al-Bukhary - from Tashkand... etc and thus we'll enter into the vertigo of apartheid, but Islam had engulfed them all. Moreover, if we want to discuss the point of view of Islam in modern things, on what ground shall we argue? Are there Arabic foundations? or, all the foundations taken from the Islamic Law (Shareeaa)? Thus the best name was "THE ISLAMIC MEDICINE", which is nearer to the fact, as for the fear of the misbehaviors, which might be alluded to Islam, wrongly, we know that all Adam's sons are sinners, and the best sinners are the repentants, we are in a stage trying to erase eras of Islamic decay and weakness, we want to contribute to Islam and to be affiliated to it again, as well as to revive its name and face all over the world, and to prove that its doctrines are applicable, and their consequences are guarantee for man's well being and prosperity.

The Organization aims, also, at retrieving the Islamic behavior which was defined to Man by Islam, and make part and parcel of his daily conduct; if cleanliness, for example, is part of the belief, as said by the prophet (ﷺ), we find our Islamic states are the least countries enjoying and abiding by this Islamic ordinance, although it is the main

road to health, and there are many wise sayings which organize the life of the Christians as well as the Muslims in order to lead a healthy and clean life, in the same way the orders and prescriptions in Islam are all related to man's psychological, social and body health; like prayer, fasting, Zakat, Haj, and others of the ordinances that have spiritual meanings which invests in Man tranquility and protects him form psychological and body diseases. There are many researches reinforcing these hypotheses, and the things that Islam forbids us from doing are essentially for our sake, we are not far away from what the world is suffering from narcotics, alcoholic drinks and AIDS which Islam prohibited.

We also wanted to utilize the plants which we have as a gift from the Lord, and Muslims have surpassed the world in this field, thus they kept their heritage of plants for the future generations, moreover they added and developed it. They wrote many books from which the Europeans took and translated and utilized till the 19th century; all their experiments and observations built on high scientific standards: Al-Hawy is considered the first scientific clinical encyclopedia in the history of the medical sciences.

Islamic civilization, at that time, was able to open its arms welcoming every active worker, Muslim or non-Muslim, as Islam has no discrimination, and no coercion in religion, no one is better than the other except by worship and good deeds, thus scientists migrated to it from east and west to add to its sciences.

I'll mention here, only, the testimonies of some Western scientists for the Islamic civilization:- "Froje Garoody" talks with sadness and grief about western Civilization; he said. "The Western civilization is dying and committing suicide because it deviated from following the natural disposition; the instinct, and its masters considered man the director of the nature which he ruled, but after five centuries of the experience we found out that Nature is the main store of the primary materials and the place for man's leftovers, this made us always

destroy nature, and this is against what the Holy Quran decided, as it decided that man is the Lord's heir on earth, and man is concerned with keeping natural balance"; then he says; "Our present western civilization is dying, not because it is short of means, but because it lacks goals". Man began to threaten himself with annihilation, and the result is the destructive weapons that man possesses are enough to destroy the planet earth one hundred times, what poor creatures we are!

This civilization is carrying in its womb the causes of its destruction, on the contrary of the Islamic civilization because the Islamic civilization is coming from the Lord who made it, not man, nor is the Islamic civilization an extension of history, but a revelation from the Lord to His prophet (ﷺ) through the Holy Quran, dictating a Holy Constitution satisfying the body and the spiritual needs of the human beings, then following this came the wise sayings of the prophet (ﷺ) to explain the Quranic doctrine, thus everything became clear, the lawful is clear and the unlawful is clear, and the difference between them is clear. The world is about to face a crisis due to its losses from addictions, as the costs of these addictions reached 14 billion $ in one year in the USA only, and these losses were in work hours, accidents, family problems... etc. due to the addiction of narcotics or alcoholic drinks, which Islam prohibited. This big sum of lost money is more than the revenue of many countries, and the world will face more than 40 million individuals inflicted with AIDS by the year 2000, and 10 million orphans; the WHO estimates the number will be doubled, nevertheless, virtue is absent, chastity killed, and they don't know where they are going... and no body knows!

Max Mayerhoof testifies: "The Islamic medicine has reflected the sun shine which was setting in Greece, and the moon glittered in the sky of the dark ages, and other stars brightened by themselves and lit the gloomy dark sky, then the moon went down and the light of the

stars waned in the revival age, but their traces are still there, to be felt in the civilization of today.."

Montgomry Watt said; "I'm not going to look at Muslims as a barbaric army invading Europe, but I'll consider them the representatives of a civilization which achieved great successes all over the world, spread them to their neighbors. The Europeans are not appreciating their debt to the Islamic Civilization!! They even try to find faults with the volume of the Islamic effect and its importance in our cultural heritage, forgetting, again, that our good relations with the Arabs and the other Islamic nations calls upon us to be aware, to the end, that we owe them, not to mention this truth, or its denial is not right..."

Montgomry Watt didn't stop at that, but he added, "Our following the Arabic Medicine, which lasted till the 15th and the 16th centuries is evidently clear in the printed books, and the first of these books was explanations of the 9th chapter of the Principles of Al-Razy, then followed the printing of Ibn-Sina for three times, before Galinos, and till the year 1500 sixteen editions of "Al-Kanoon", the "Law". The statistics show that the quotations and extracts found in the early European writings are evidence that the impact of the Arabic books surpassed and surmounted the Greek one.

He says, too, "Islam in essence is not only a mere religious movement, but it is also a human value embedded in life of the peoples who embraced Islam, or joined it, it was a kind of unique human existence in the world as the conditions of the Islamic openings were to permit the other people to continue practicing their former habits, laws, and languages, for paying taxes (Jiziah), these Islamic rules strengthened the relations between the Muslims and the peoples of the countries they conquered, thus the people continued to practice sciences, arts and especially medication.

These three testimonies are only a sample, there are a lot of others for which there is no space to quote here, but in time we will.

In addition to this, the last WHO statistics mention that 25-30% of the diseases from which man suffers nowadays are caused by the side effects of the chemical medicines, as well as their high prices, and the expertise which they need to manufacture. Contrarily, however, our Islamic countries enjoy a suitable weather for the medicinal plants to grow and treat a lot of diseases. All we need are issuing political decrees as China and India and other nations which produce these medications in the most modern fashion.

This is a short synopsis about the idea of Islamic Medicine, and to reinforce this idea, we invited a group of Muslim thinkers to take part in many conferences to write in this field, and we have received a lot of their contributions which will be published in due course of time, under different headings.

SUMMARY OF THE PAPERS IN THIS BOOK

This book embodies twenty exhaustive papers dealing with the scope, potential, prospects, quality control, surveys, and advantages of phytotherapy togetherwith the pharmacognostical investigations on some plants, and methodology for clinical evaluation of herbal formulations in patients suffering from bronchial asthma.

In the first paper, Mills has prudently evaluated the role of the herbal remedies as an alternative to modern drug therapy and has demonstrated by means of examples how the evidence that does exist for a few individual remedies can be assembled to make a case for their vitalistic application. And, in doing so, he has successfully advocated the cases of *Crataegus monogyna, Allium sativum, Glycyrrhiza glabra, Cichorium, Silybum marianum* and *Vitex agnus-castus*, on scientific footings based on systematic pharmacological studies.

The potential of herbal medicines in modern medical therapy has been superbly described by Hakim Said with relevant examples of how plants led to the growth of synthetics. He has also mentioned about the chemotaxonomy and the isolation of active principles of certain plants, and presented his personal experiences and impressions upon *Tamarix gallica* which has gained considerable importance in the materiae medicae of the sub-continent. Icterene isolated from *Tamarix dioica* has been found effective in the treatment of jaundice. It has also been successfully employed in oliguria or where diuresis is required; in mild infective and febrile states it acts as a diaphoretic and lowers the body temperature. Icterene is devoid of known toxic or adverse side effects. He has stressed that treatment by means of natural drugs enshrines thousands of years of experience and rather than refuting them scientific studies have confirmed their efficacy.

While emphasizing the importance of, and renewed interest in, traditional medicine, Wagner has stressed the need for modern

phytochemical research. He has, however, opined that it is the therapeutic effect which is important and not the activity of monosubstances as proven by the pharmacological tests. None-theless, the knowledge of a new active principle can provide stimulation to drug research as a whole and, in this context, he has quoted the examples of his researches on *Annona squamosa, Colobrina asiatica and Silybum marianum.*

Darwish Sayed has advocated for researches on the therapy with drug plants since WHO has also recognised medicinal plants as an effective source of therapeutic agents which gave a significant push to international concern and research in the field of therapy with drug plants. He has given the examples of plants already industrialised such as *Ammi majus, Ammi visnaga, Cymbopogon proximus, Nigella sativa* and *Aloe vera*, and also of those which are under investigation for industialisation, namely - *Urginea maritima, Phytolacca americana, Euphorbia* spp., *Glycyrrhiza glabra, Cynara scolymus, Solanum laciniatum* and *Lawsonia* spp.

The advantages of herbal medicines for the amelioration of human sufferings have been discussed by Rama Rao. He has emphasized that the therapeutic usefulness of herbal preparations in chronic conditions such as rheumatic disorders, sinusitis, skin diseases etc. have been amply experimented with satisfactory results; in addition acute condtions like infective hepatitis, a few type of skin allergy, urolithiasis are also treated successfully, the response being equal to or better than with modern medicine. He has suggested further exploitation of ancient literature and benefitting ourselves by collaborating with Hakims well-versed with the subject, for joint efforts and keen observations may help in understanding several unsolved problems.

An inventory of medicinal plants used in the traditional Arabic medicine has been prepared by Munoz and Valverde. They have documented the survival of at least fifty herbal drugs in European

Pharmacopoeas, and have opined that Occident and Orient nearly always coincide in the number of frequency of repeatation of each drug and have offered the examples of at least 18 such plants.

Methods of obtainig a new herbal drug by using data on traditional medicine has been described by Bojor. He has stressed upon a fact that "we consider very important one: a medical or a therapeutic system cannot be validated or cancelled by the investigating means of another system; if one tries to do so, he makes a fundamental mistake. In other words, if one does not know the theoretical basis of a medical system, he cannot declare it efficient or otherwise. This point is of immense value because the researchers in the drug field in the industrialised countries try to demonstrate in a subjective, unilateral way to characterize a drug or a traditional cure by means of investigating methods belonging to their system".

The academic and scientific nature and value of Islamic Medicine has been meticulously discussed by Nadvi. In support of the usefulness of Islamic Medicine, and its scientific nature, he has mentioned the fact that the modern science whenever it carried out research on herbal drugs of the old, it has only confirmed and verified, and not contradicted or falsified, the effects, characteristics and indications for use of those drugs which are already determined by classical physicians. This only brings out into lime light the fact that the old and the modern researchers have the same opinion in respect of the usefulness of the old traditional drugs. The difference, if any, is only of the method of processing and research, the old method being visual and experimental while the modern is based on microscopic and chemical analysis. The difference in the two methods has resulted in variation in their terminology but has not led to any conflict. Both reflect and interpret the same truth. Certain relevant examples are mentioned by the author.

The importance of quality control of herbal medicines has been duly emphasized by Haq. He has advocated the concept of Good

Manufacturing Practices (GMP) through legislative measures to ensure the quality of herbal medicines. GMP includes control on the quality of starting materials i.e. herbal drugs and additives, cleanliness and efficiency of the equipment used in manufacturing, the quality of personnel i.e. their qualification, experience, hygienic conditions in the manufacturing area, the effectiveness of the methods of operations etc. He has lauded the Draft legislation to ensure the quality and efficacy of herbal drugs prepared by the Ministry of Health, Kuwait and the IOMS with the collaboration of EMRO, WHO.

The status of herbal drugs has been researched by Cubukcu. He has appended a list of over 275 main herbal drugs sold in Turkey, besides a list of about 39 plants used in medicines as active compounds and their frequency of use. In addition, a list of plants which give the herbal drugs that are used in medicines as they are or in the form of their Galenical preparations and their frequency of use in the medicines has also been appended; this list is divided in two parts - (i) plants growing in Turkey, (ii) plants growing in other countries (foreign - originated plants).

The contribution of Saudi medicinal plants in Islamic medicine has been amply surveyed and described by Al-Yahya. He has listed 50 plants mentioning their botanical names, geographical and ecological distribution, chemical constituents, medicinal uses, and pharmacological properties besides describing the results of phytochemical and pharmacological screening of 10 Saudi medicinal plants, particularly in relation to their effects on cardiovascular, and CN systems, respiration, temperature, skeletal and smooth muscles, microorganisms, serum glucose, cholesterol and electrolytes, and on the RBCs, WBCs and haemoglobin. Also, a survey researches on the active principles of Turkish medicinal plants has been presented by Atasu and Ilisulu.

Some observations on the role of classical methodology in

modern phytochemistry have been made by Siddiqui. Without in any way minimising the importance of studies related to the emergence of new techniques like paper and column chromatography, electrophoreseis, counter-current distribution, vapour phase chromatography, UV, NMR particularly in the field of correlation of structure and activity, he has stressed that the classical procedures continue to have an important place in the isolation of plant constituents and the experimental management of chemical reactions.

Some approaches to the study of indigenous medicinal plants have been discussed by Attaur Rahman. He has opined that if the efficacy of individual herbal preparations in specific diseases can be scientifically established by means of comprehensive pharmacological and clinical trials, and toxicological data is satisfactory, then there is no reason why herbal extracts should not be incorporated into an integrated pharmacopoeia. He has further mentioned about his researches on the isolation and structure elucidation of chemical constituents of certain plants used in the indigenous medical systms, these include *Berberis aristata, Rhazya stricta, Fagonia indica, Betula utilis, Cucumis prophetarum, Loranthus grewinkii* and *Catharanthus roseus.*

The Islamic contribution to the knowledge of opium and *Papaver* spp. has been described by Baytop and Sariyar particularly in the light of the information provided by Ibn el-Baitar in his treatise. They have also described the chemical compostion of different species of *Papaver* obtained from different sources.

Pharmacognostical investigations of the plants of Turkey containing triterpenic saponins have been described by Sezik and associates, some of the crude saponis obtained from the investigated plants were found to exert antifungal and antiviral activities. They have also mentioned the results of pharmacognostical investigations on the plants used as folk medicine in Turkey in two separate papers. In the first paper, they have presented result of studies on *Sideritis* and

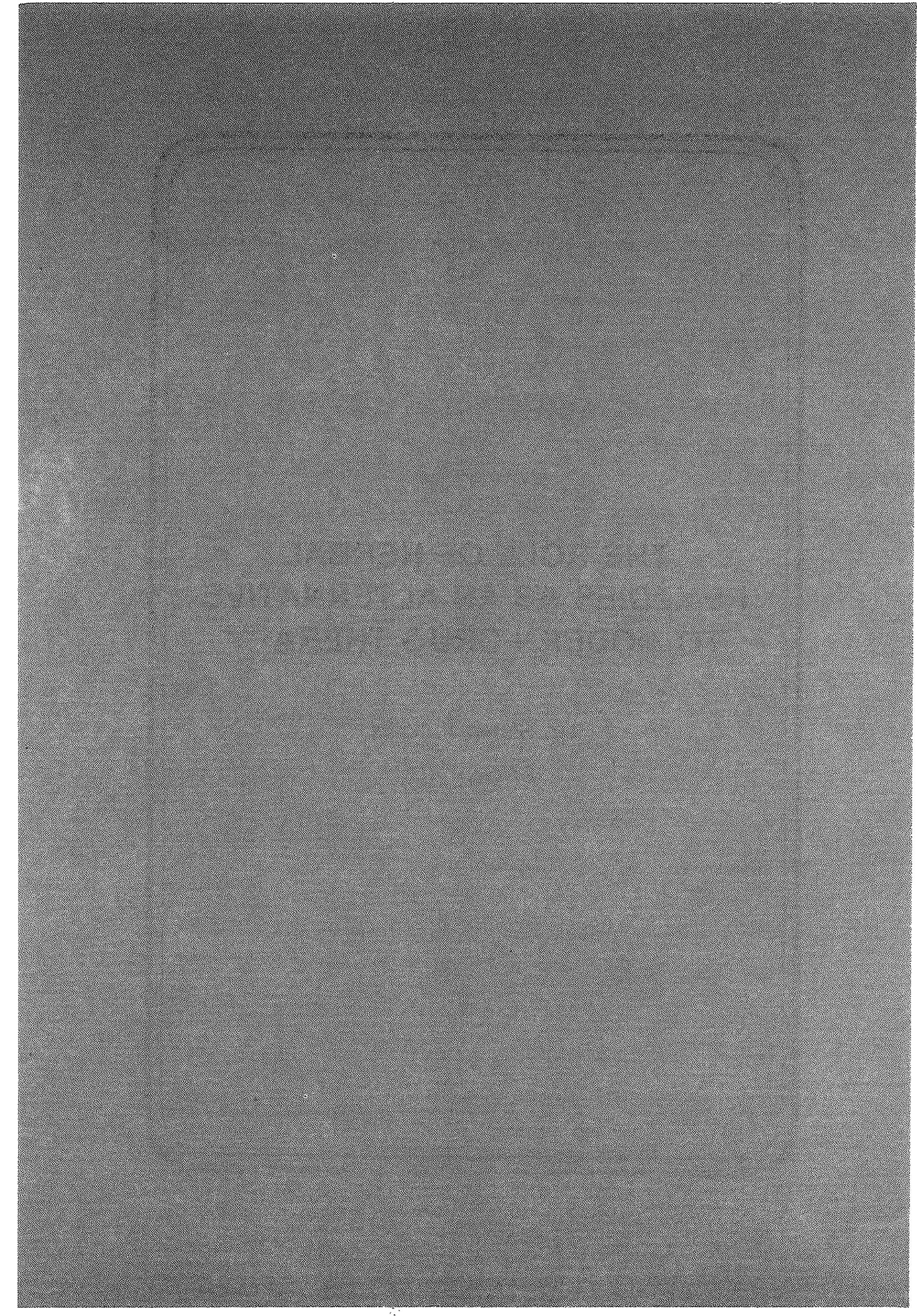
Ziziphora while the second paper contains the results of studies on *Thymus sipyleus, Stachys lavandulifolia var. lavandulifolia* and *Ecbalium elaterium.* In another paper, Tanker and coworkers have described the pharmacognostical investigations on Turkish *Tilia* species, namely - *Tilia argenta, Tilia rubra* and *Tilia platyphyllos.*

The research methodology for the clinical evaluation of drugs in bronchial asthma (*Zeequn Nafas*) has been described by Siddiqui, *et al.* They have stated that the clinical trial is completed in four stages - (i) preliminary study (phase I), (ii) controlled study (phase II), (iii) double blind study (phase III), and (iv) final study (phase IV), and have appended different proforma to be used during the trial, and also a list of 15 plants used in Islamic medicine for the treatment of bronchial asthma.

THE ROLE OF HERBAL REMEDIES AS AN ALTERNATIVE TO MODERN DRUG THERAPY

Dr. Simon Y. Mills

ENGLAND



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PREAMBLE

The practitioner of herbal medicine in the modern world has few ways in which to present his arguments for the advantages of his chosen therapy to the scientific and medical community. There are several reasons for this. It is inherently difficult to analyse, quantify or predict the exact pharmacological action of an agent that is both chemically extremely complex and highly variable as between samples. There is in fact very little doubt that even the attempt to accomplish this in order to gain complete scientific 'respectability' for herbal medicine is doomed to failure. An equally difficult problem in communication is provided by the insistence of the serious herbal practitioner that the aims of the therapy must be qualitatively distinct from those of modern western medicine. This is a point ignored in most popular accounts of herbalism in the west and deserves a little elaboration here. It is a central abiding principle in the professional practice of herbal therapy that the patient manifests uniquely a will to live, a life force, an unquantifiable and astonishing ability to grow, prosper and thrive, to transform environmental stresses into health in the positive sense of that word. This means that the practitioner accepts that there is already present a will and ability to recover from setbacks and disease, a 'vis medicatrix naturae' as Hippocrates put it, and that it is therefore the practitioner's obligation to aid the natural

* Bulletin of Islamic Medicine, 2:543-550, 1982.

healing process when this is obstructed. The process of disease is seen, not as something to be arbitrarily removed by direct antagonists to the pathological process as visualized in modern 'allopathic' therapy, but as a manifestation of thwarted recovery process. The symptom is seen, literally, as a 'signpost', to be read as part of an attempt to locate the nature of the obstruction, to assess the needs of the underlying vital functions. Herbal remedies are then seen as essentially supportive of these functions, and it is considered that an evaluation of their potential as healing agents must be bound to this fact. The herbal practitioner therefore resists the facile listing of herbal remedies as effective for ameliorating arbitrary pathologies. Much more important to him is to understand something of the physiological activity of a remedy than to be told that it is good for arthritis or asthma or whatever. Each patient is considered as a unique case, to be treated most likely with a unique formulation of remedies independent of the pathology he or she might be labelled with.

All this means that the parameters by which a herbalist finds a remedy valuable are often quite distinct from those current in scientific medical thought. Evidence of validated antipathological activity is genuinely less important to the herbal practitioner than the day-to-day experience of its efficacy in the personal encounter. The value of any scientific findings is seen more as a potential elaboration of a total view of the remedy's activity in the physiological realm than as a binding definition of its actions and limitations. Much more could be said of the implications of this viewpoint, of the different view of the effects of treatment and its course in time, of the new light cast on the concept of the 'side-effect', and of the accommodation that the herbalist finds possible with the pharmacological complexity and variability of the materia medica. However, that is the province of a more philosophical treatise. The purpose of this article is to demonstrate by means of example how the evidence that does exist

for a few individual remedies can be assembled to make a case for their vitalistic application in the manner briefly described.

In the presentation of what analytical and experimental evidence does exist information will have been called from a very wide variety of sources. To reduce the opacity of this paper accredition will not be made for absolutely every analytical statement. Rather there will be appended a general literature list from which the bulk of the detail has been obtained. Specific literature citations will be restricted to the most notable claims in the text. The author will be pleased to provide any reader with detailed sources for any other item that interests him particularly. The restriction in citations will be particularly apparent in the lists of constituents for each remedy and in the more widely accepted pharmacological activities.

***Crataegus monogyna* (Jacq)**

This is one species of a pair that is found widely throughout Europe that is for medicinal purposes taken together (the other more temperate species being *C. oxycantha*). *C. monogyna* is found in Europe and around the Mediterranean regions into north and West Asia. It is a shrubby tree found commonly in hedgerows in cultivated areas with corymbs of small white or pink flowers giving way to red berries in the autumn. The leaves are lobed and stipulate. Throughout Europe, *Crataegus* has earned a reputation as a useful remedy for disorders of the heart and for dropsy; its use for coronary and circulatory difficulties is a more recent phenomenon than other long-established usages but this perhaps reflects the increasing understanding of heart function in the last century. However, it is now one of the prime remedies for treating a variety of cardiac problems in the European materia medica, appearing to have the ability to dilate the coronary vasculature whilst also having a bradycardic effect on heart rate. It finds equal applicability for angina and other coronary difficulties as for the treatment of arrythmias, especially where the

latter have arisen from prior coronary disturbance. Beyond this there is apparantly a general vasodilatory effect that helps in the overall treatment of some cases of hypertension and in some of the circulatory problems consequent on arteriosclerosis (e.g. intermittent claudication). In brief, the modern herbal practitioner sees *Crataegus* as a superb heart 'food' and relaxant with a gentle but cumulative general vasodilatory effect as well.

There is a considerable body of experimental evidence to support these impressions. A list of constituents for the leaves, flowers and berries would include the following:

Flavonoid glycosides (including, rutin, quercitrin)

Triterpenoid saponins ('Crataegus lactone')

Procyanidins

Trimethylamine

Condensed tannins (forming red phlobaphenes, insoluble complexes).

It is well-known, following Szent-Gyorgy, that flavonoids have an observable effect on the vasculature, reducing capillary fragility (providing essential *in vivo* support for ascorbic acid), dilating coronary blood vessels, slowing the heart rate whilst increasing stroke volume. They would thus provide a fair explanation for the effects of *Crataegus* if they were not also widely found in many other plants and foodstuffs that do not exhibit these effects to any notable degree. Further support, however, is provided in the report that the pholbaphene fraction (i.e. deposited condensed tannin complexes) showed evidence of the prolonged vasodilatory effect on the coronary vessels, and in addition increased the amplitude of the heart's contraction and potentiated the effects of caffeine, adrenaline, adenosine and papaverine on coronary circulation[1]. Increased vagal tone slowing heart rate is a fair conclusion from the known effects of the procyanidins (yielding cyanides on hydrolysis), and from the suggestion that the whole plant exhibits anticholinesterase activity[2].

Perhaps the most active components may yet prove to be triterpenoid saponins. This class of plant constituents has only recently been investigated and has already been shown to be instrumental in the actions of *Panax ginseng* and *Glycyrrhiza glabra* (see below) for example. Most pertinent here is the work that has been done on the saponin fraction of *Aesculus hippocastanun* that has shown that it is notable in the whole remedy's action in reducing oedema and benefiting varicosed veins[3,4]. Whatever the pharmacological explanation however there are clinical records showing the ability of the berries to reduce hypertension caused by both arteriosclerosis and renal damage[5], and the flowers to improve the health of heart patients troubled with mitral stenosis and progressive coronary occlusion[6]. Other studies concluded that the remedy had a favourable effect in cardiac arrythmias, especially extrasystoles and paroxysmal tachycardia[7], and prevented ECG changes due to hypoxia[8]. A reduction in digitalis dosage after treatment with *Crataegus* is a strong possibility[9]. No side effects have been reported during therapeutic use, toxic problems only arising with massive intravenous dosages or with non-therapeutic doses administered chronically[5].

Allium sativum **(L)**

This remedy has generated perhaps more scientific curiosity and research than any other plant not cultivated for supplies of allopathic drugs. It has through the ages accrued an almost phenomenal reputation for helping a wide variety of conditions. It has moreover played a significant part in the diet of many countries.The main limitation to its use in European countries has been a strong social objection to the odour on the expired air of the taker, but there have been areas where this has not been insurmountable and there is also the use of de-odourized preparations that have prospects in some applications. In general, the uses of garlic have fallen into two groups: the antimicrobial action it appears to possess, and the number of

interrelated benefits it seems to have on the circulation. Of the two, it is the former that has been concentrated on in traditional herbalism ("a good preservation against infections": Parkinson, 1640 AD) whilst the use of garlic for circulatory problems, unusually, owes much to modern research findings for the plant. We shall look first at some known constituents:

Volatile oil-allin, separated from enzyme alliinase in intact plant; when crushed the two interact and allin is converted to allicin which is further oxidised to diallyl disulphide[10].

Glucokinins

Germanium

Mucilage

From an early stage it was clear that the volatile fraction, notably allicin was responsible for the anitbacterial action of *Allium*[11], it was found to be active in concentrations as small as 1:85,000[12]. Clinical evidence for anitmicrobial activity has generally supported the traditional usage. Initial controlled trials to check the use since ancient times of *Allium* for leprosy were sufficiently encouraging for further testing to be recommended[13]. It was found to perform commendably in the treatment of tuberculosis[14], and achieved a sound reputation in both World Wars in preventing sepsis and controlling suppuration. Some of the most interesting work has been done to investigate the potential of *Allium sativum* in normalizing bacterial populations in the gut: it has been one of the more common claims for the remedy by practitioners that it could check gut infections without destroying normal healthy flora. Some backing, if not explanation, for this assertion comes from Weiss[15], who reported a complete change in intestinal flora after *Allium* treatment, and from Marcovici[16] who reported significant improvement in dysenteric diseases. Other clinical work has demonstrated relief in a number of gastro-intestinal disorders, including flatulence, vomiting, nausea, abdominal distension and dyspepsia[17, 18]. Given these findings,

supported by herbal practitioners today, it is hard to avoid accepting that the action of *Allium* on the bacterial population of the gut is selective. Effects on the gut that are possible relevant to this activity include a general stimulation of digestive juices[15], and an increased absorption of thiamine from the intestine[19]. There has also been observed a direct antimicrobial effect against staphylococci, streptococci, *Escherischia typhosa, Bacterium dysenteriae, B. enteritidis*, and *Vibrio cholerae*[20, 21, 12].

At the early stage of research, the applicability of *Allium* to the treatment of cardiovascular disease was established. Marcovici was among many who suggested that the elimination of toxin absorption from the gut was central to this function[22], and this is a theme still taken up today. However, there is also clear evidence for direct effects on the circulation and vasculature; in reducing post-prandial blood cholesterol levels[23], and blood sugar levels[24] - possibly involving the glucokinin constituents - as well as platelet aggregation, thromboxane synthesis and thus the tendency to thrombosis[25]. Circumstantial evidence for the beneficial effect of *Allium* on the circulation comes from an examination of the statistics for heart disease in countries with or without a high consumption of garlic in the diet[26].

The traditional use of garlic for tumours is also supported by recent research. Enough *in vitro* and *in vivo* results have been forthcoming for one researcher to conclude that "it may lead to an effective therapeutic attack on the cancer problem"[27, 28]. Japenese researchers have suggested that it is the presence of unusually high levels of the mineral germanium that is a vital feature in the antitumour activity[29].

In total, there does seem ample backing for the herbal practitioner's view of *Allium* as an effective aid to the body in its attempts to come to terms with pathogens in its environment.

Glycyrrhiza glabra (L)

This is another plant whose traditional usage and modern potential have happily overlapped, with the latter being particularly notable. A brilliant survey of the subject has been conducted by Gibson[30] and much of what follows is provided, along with full references, by him, with a minor contribution from other sources. In the past *Glycyrrhiza* has been used for its soothing and healing actions on the gastrointestinal tract and the respiratory system principally. There are incidental reputations for fever management and urinary disturbances as well. On examination, its constituents are found to include:

Glycyrrhizin (salts of glycyrrhizic acid)
Triterpenoid saponins
Flavonoids
Bitter principle (glycyramarin)
Asparagin
Oestrogenous substances (including β-sitosterol)

The key feature in the activity of the plant seems to be a steroidal fraction that includes the aglycone of glycyrrhizin, glycyrrhetinic acid, and the near steroidal triterpenoid saponins. The similarity of these substances to steroidal hormones has helped to explain a number of hormonal effects in many medicinal plants. In *Glycyrrhiza* these effects are prominent. Thus it has been shown to have anti-

glycyrrhetinic acid

deoxycortisone

inflammatory and anti-arthritic effects similar to hydrocortisone, to resemble the activity of ACTH in causing aldosterone-like retention of water and sodium, and loss of potassium at the kidney, increased blood pressure, and decreases in haemoglobin levels. It enhances the immunosuppressive action of cortisone, but on the other hand, inhibits its antigranulomatous action and its effects in increasing liver glycogen storage. The action of glycrrhetinic acid here is dependent on a functioning adrenal cortex: there appears to be a direct ACTH - like effect increasing adrenal production on the mineralocorticoids and androgens, but there is also an effect on reducing the breakdown of the corticoids at the liver and kidney. The effect can be dramatic: it has been reported[3] that a woman with Addison's disease was maintained completely with an initial dose of 60g liquid extract of *Glycyrrhiza* per day, this dose being eventually reduced so that a maintenance dose of 3g daily was achieved. Whatever the full explanation of this effect proves to be it will also include the raising of serum levels of glutamicocaloacetic acid transaminase and glutamicpyruvic transaminase and thus the uncoupling of oxidative phosphorylation. The potential local actions of *Glycyrriza* are supported by the anti-inflammatory effects exhibited in treatment of corneal injuries and in cosmetics. There is further support for an inflammatory effect in the widespread allopathic use of *Glycyrrhiza* constituents for petic ulcers, though this is put largely to the ability of the remedy to promote an adherent film of protective mucus over the gastric wall, and possibly to reducing gastric acid secretions. Glycyrrhizin is found to increase bile secretion and the excretion of bilirubin and to have an antipyretic effect comparable to sodium salicylate.

These varied effects support the notion among modern herbal practitioners that *Glycyrrhiza* is well suited to providing benefit in any attempt to wean a subject off excessive administration of cortisone or other steroids.It appears to have many of the relative advantages of ACTH with yet easy applicability by mouth. There is postulated the

possible danger hypokalaemia and hypertension due to the mineralocorticoid effect if *Glycyrrhiza* is taken in large doses for an extensive period. This is no doubt a real risk but apart from glycyrrhizin the whole plant possesses diuretic components, notably asparagin and the flavonoids, that may diminish this effect. The application of *Glycyrrhiza* to disorders of the respiratory system seems to be backed by its anti-inflammatory (and anti-allergenic) effects, with effects in tuberculosis comparable to deoxycortisones. There is also the reflex effect on the activity of bronchial muscle and the mucociliary escalator of all mucilaginous plants[23]. Its tradional and clinical use for asthmatic conditions and excessive coughing seems well supported here.

***Cichorium intybus* (L)**

This plant is chosen arbitarily as an example of one of the many 'bitter' remedies used throughout the world for their ability to stimulate the upper digestive system, increasing appetite, promoting the flow of digestive juices, and by increasing bile flow, 'cleansing the liver'. It has generally been accepted that the mechanism involves a reflex response to stimulation of the bitter taste receptors in the mouth (i.e. bitters are quite inactive when given by tube direct into the stomach). What has transformed the understanding of these bitter substances is the finding[33] that the immediate result of stimulation of the bitter taste receptors is the release of the gastro-intestinal hormone gastrin. This in turn is known to increase gastric acid secretion (and thus the sterilizing stomach acid 'barrier' to gastrointestinal infection), increasing intestinal mobility, and increasing the secretion of bile and pancreatic juices. There is also an increase in salivary secretion (but not amylase)[34]. From these effects it is easy to project benefits for liver function especially in its detoxifying and eleminatory functions, and for the pancreas, including the endocrinal secretions linked as these are to the flow of pancreatic juices and thus explain in turn the apparent benefit that bitters have for

disturbances in blood sugar levels. Gastrin is also active in increasing appetite and a general sense of well-being; with this and the undoubted benefits on digestion it is not surprising that bitters were for long considered superb general enhancers of vitality.

Silybum marianum **(L)**

This Mediterranean plant has been used in middle Europe for liver complaints for many years, the seeds being considered the active part. A protective effect on the liver has in fact been recently demonstrated[35], notably against the common experimental hepatotoxins carbon tetrachloride and phalloidine (from *Amanita phalloides*) and against chemically-induced cirrhosis. This protection lasted many hours after treatment. The conclusion drawn has been that the cell membranes of the hepatocytes have in fact been stabilized against the destructive effects of toxins. The main activity in the remedy has been conclusively associated with an unusual type of flavanoid-lignoid complex or flavolignan, in this case known as silymarin: this has been shown to enhance the activity of polymerase A produced in the hepatocyte nucleolus so leading to increased ribosomal RNA activity and thus protein synthesis in the cell. It is this, with the membrane-stabilizing effect that is seen to explain not only the ability of the remedy to help protect toxicity, but to stimulate regeneration and repair as well.

Vitex agnus-castus **(L)**

It is one of the claims made for medicinal plants that they have an amphoteric or normalizing effect rather than a dynamic unilateral one. The actions of *Vitex* appear to be a good example of this. Its tradional use has been for disorders of the female reproductive system, with an almost contradictory list of indications (heavy menstruation and amenorrhoea for example) and including a notable effect in promoting lactation. In recent practice its applications have if

anything been wider, forming the basis for treatments for all manner of menstrual disorders, particularly premenstrual problems, menopausal symptoms, menorrhagia and dysmenorrhoea. The impression gained in usage has been that the remedy somehow normalizes the balance of sex hormones at different times of the month, with if anything a slightly progesteronal effect. Support for this has been provided by Probst and Roth[36,37] who have shown that *Vitex* has effects similar to the corpus luteum on human subjects, established by histological investigation of the endometrium by curettage, by cytological examination of vaginal secretions, and by observing changes in basal body temperature. Further work with the oestrus cycle of rats showed the effect in shortening the oestrus only apparent in test animals already having abnormally frequent or lengthy cycles; from this and from clinical therapeutic results with patients it is summarised that the effect of the remedy is to normalize corpus luteum function, along with perhaps ovarian function in general, via the controling centres in the hypothalamus, rather than simply replacing corpus luteum hormone (there are no suitable steroidal components of the plant in any case)[38]. Confirmation of a significant effect on lactation has also been provided[39].

DISCUSSION

A review of the available evidence for a number of herbal remedies is here presented. The remedies have been selected from a wide field and reflect the average state of affairs that pertains to the investigation of the better known remedies, although it must also be said that there are a great many remedies that have been barely examined experimentally in modern times. From what has been said at the beginning of this paper it will be apparent that the aim of assembling this information is to provide a modicum of independent support for the claims of herbal practitioners for their remedies, and incidentally reveal to a few that observable pharmacological activity is a property

of herbal remedies (contrary to some allopathic pronouncements). The ultimate purpose of this paper, however, is to present the case for the use of herbal remedies as a valid healing therapy in the modern age. It is thus useful to reiterate the message of the preamble, that the herbal practitioner sees the herbal remedy as essentially supportive of body function, amphoteric rather than unilaterally active, promoting a vital body response to invasion or obstruction rather than aiming simply to remove the superficial characteristics of the latter. We thus find the herbal practitioner using *Crataegus* equally in cases of high and low blood pressure for its tendency to normalize this parameter. The evidence suggests that by supporting the function of the heart whilst also having vasodilatory action, may be something in this. We also find the practitioner using *Vitex* as a general normalizing remedy in a variety of gynaecological conditions, and we have the supporting contention that the remedy acts pivotally on the hypothalamic-pituitary axis. Body function can be supported in more direct ways too. The use of the bitter remedies provokes a reflex response on the part of the body that is comprehensively useful in improving a range of functions associated with the body's relationship with food. It is contradicted only when that relationship is already marked by overactivity, for example in hyperacidity or vomiting. Otherwise, the bitter effect is clinically useful for many upper digestive problems, including such diverse conditions as anorexia, diabetes and hypoglycaemic syndrome, hypochlorhydia and tendency to enteric infections, chronic liver disease and liver-centred toxic problems. A third way to support vital function is by using trophic remedies; these are remedies which have an almost nutritious action on a specific organ or tissue. *Silybum marianum,* we say, demonstrated such an action on the liver parenchymal cells, and in a sense we can see the same relationship to the adrenal cortex of *Glycyrrhiza glabra,* with its ACTH action and also yet its corticosteroid - enhancing effect in the periphery. Similarly the total action of *Allium sativum* on the blood

stream can be considered trophic, improving a broad range of functional parameters and we have already witnessed the trophic effect of *Crataegus* on the heart.

The action of herbal remedies in support of vital body function therefore comes in three categories, 1) the amphoteric regulation of excessive functional oscillations, 2) the direct provocation of a healthy reflex response and 3) the straightforward trophic effect. Central to any of these actions is the intrinsic complexity of each remedy's constitution. One very often finds constituents present with apparantly contradictory isolated pharmacological actions, as for example in the water-retentive glycyrrhizin and other diuretic constituents in *Glycyrrhiza*; the impression gained is of a potentiating of individual contributions to the total action so that the whole plant is made up of more than the sum of its parts. Thus even in those remedies with an almost allopathic effect such as *Allium* with its antimicrobial action and *Glycyrrhiza* with its anti-inflammatory effect, there is sufficient complexity in both the active constituents of the plants and of other reported pharmacological effects to make it clear that we are not comparing them directly with allopathic counterparts. Evidence of supportive actions as outlined above in particular give each such remedy a much more founded and substantial effect overall, perhaps at the expense of the dramatic effect familiar in allopathic circles.

This is only a fraction of the case that could be prepared for herbal medicine. Many more remedies would have to be discussed to provide the complete story. It is hoped, however, that sufficient has been said to make the point that herbal medicine is worthy of consideration as a valid health care alternative in the modern world. One is mindful of the comments of the World Health Organization on the role of traditional medicine where the facilities of modern medicine are lacking. The author would hope to make a plea that herbal remedies be considered in an even more positive light. Those with scientific training will perhaps contend that the use of scientific data to support a case for

using techniques that cannot be completely validated or even explained by the rigours of the experimental method is a case of having the best of both worlds. To this the author must answer that if it came to a conflict then the herbalist would turn his back on the experimental method rather than to the evidence of his own eyes and ears and that of his patients; however, there is no need for a conflict to occur, the scientific method does contribute to man's understanding of the world when used with enlightenment and true humility. It is to everyone's best interests to work together towards improving the quality of life and health.

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POTENTIAL OF HERBAL MEDICINES IN MODERN MEDICAL THERAPY

Hakim Mohammed Said

PAKISTAN

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One of the important aspects of the Second Conference on Islamic Medicine is concerned with the beneficent nature of natural drugs in therapeutics. The importance of this aspect is hardly in need of being underscored. When we say that treatment by natural drugs is closer to nature, we actually do not state something vague or metaphysical but something that is concrete and observable. A balanced diet ensures wholesome corporal resistance and generation of antibodies. Secondly, treatment is effected through the administration of concentrated active principles in herbs which we eat or which are allied to them. They thus bring about cure without generating the side-effects which have become the bane of modern medicine, mostly based upon synthetics.

Plants and man are inseparable. On no other commodity has man lavished such tenderness and the way the wild plants have been genetically tamed is a separate story. Certain plants like *nehar (Calotropis gigantea* or gigantic swallowwort) and *yabrinj (Mandragora officinalis* or mandrake) have certain superstitions attached to them. This is no doubt because of the dual properties of many plants. Thus the root and leaves of *bazr el-fuji (Raphanus sativus* Linn. or radish) are likely to cause heaviness in the stomach, but the seeds and the decoction of the plant are likely to act as diuretic, laxative, and lithontriptic agents. And reports, through screening, upon even as familiar a plant as the carrot have established what untold good it is

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likely to do to man and to the smokers in particular. The very fact that plants like broccoli, spinach, and tomato, supply so much of vitamins to man should serve as an indemnity against disease and help bring about natural cure.

I should like to quote a few examples of how plants have led to the growth of synthetics. During the late thirties it was observed that the cattle fed upon spoilt sweet-clover died of haemorrhage. On further study it was found that this haemorrhagic effect was due to a chemical, dicoumarol, which in the US Pharmacopoeia is known as bishydroxycoumarin. The synthesis of this haemorrhagic agent was finally accomplished by Link, Stahmann, and Huebner in the laboratory in 1941. It was thought that the haemorrhagic property of this chemical could be turned to advantage, and, in fact, Townsend and Mills in 1942 reported that in six patients repeated doses of 200 to 300 mg every day prolonged prothrombin and clotting time. Vitamin K, about which we will speak later, counteracted this effect. If therefore man makes the sweet clover a part of his diet or takes an allied species like the fanugreek, some indemnity against thrombosis and embolism is expected. And from this particular mishap in the Prairies has cropped up a series of drugs allied in structure to dicoumarol, e.g. Cumopyran, Tromexan Ethyl Acetate, Marcoumar, Dindivan, Warfarin (which was again synthesized by Link and Crowrle in 1947), and so on.

Vitamin K, the antihaemorrhagic factor, was reported by the Danish scientist, Dam, for the first time in 1929. It was found that the haemorrhagic tendency in chicks was overcome by adding alfalfa, spinach, kale, or fish meal to the diet. Dam and his associates, as well as Doisy and his associates, isolated the pure vitamin from alfalfa, calling it K, to distinguish it from the vitamin called K2 which Doisy, McCoquordale, and their co-workers isolated from putrefied sardine. Both K and K2 were shown to be naphthoquinones. And thus medicine was on way to having even more potent synthetic

counterparts which apparently acted by counteracting the effects of dicoumarol by lessening, according to Maritus and Nitz-Litow (1953), the rate of aerobic posphorylation. The structural resemblance of dicoumarol to Vitamin K has led to the view that dicoumarol competes with Vitamin K and displaces it from an enzyme system which is required in the synthesis of factor VII and prothrombin.

We thus find how an isolated case of the incidence of haemorrhage in cattle in the Prairies led to a series of drugs having reverse effects.

Griffith and co-workers (1944) also have a ketone group, although it is a flavone compound, and is, in fact, the rhamnoglycoside of quercetin. It is of particular use against recurrent haemorrhages caused by or related to capillary fragility. It occurs in several plants; the stem of tomato has sizeable amounts of this antihaemorrhagic agent and was first tried clinically in 1944.

It is certainly true that synthetic chemistry has come out with more potent antihistamines than are to be found in nature. But we should not forget that for a long, long time ephedrine served as the drug of choice against asthma and hay-fever and that its preparations, the base, hydrochloride, and sulphate are still official.

It has been observed that patients with asthma are more sensitive to histamine than normal subjects and these attacks may be prevented by means of ephedrine, a plant drug (although now also synthetically prepared) and adrenaline, a body-product.

Work on chemotaxonomy has not yet started properly. Erdtmann and Darnley Gibbs have already shown that startling discoveries of both fundamental and applied nature could be expected if the work is pursued methodically. It is quite tricky also. An example of this trickiness was cited by Dr. S. Siddiqui 18 years ago when he reported that three crystalline solids had been isolated by himself and co-workers from the Bengal gram (*Cicer arietinum* Linn.) viz. Biochanin A (5:7 - dihydroxy, 4 - methoxy is a flavone), Biochanin B (identical with the isoflavone for menonatin occurring in soy-bean),

and Biochanin C (identical with asparagin which occurs in *Asparagus spp.* and in *Abutilon indicum* Linn., a plant belonging to Malvaceae). It was found that these solids could not be isolated when the gram sprouts were dried in the shade and extracted with solvents. Such observations bear out the Islamic concept of medicine which claims that drugs are liable to lose their potency if not given in their proper form. Some drugs gain in potency on ageing; others lose. We have seen how even a harmless plant like the clover can become lethal to animals.

Nor is it true to hold that natural drugs, apart from antibiotics, do not counter microbial attacks. Garlic has been used for time immemorial as a carminative, expectorant, febrifuge, and in the treatment of intermittent fevers. Carallito and Bailey (1944) had already isolated allicin from it. Parry isolated two sulpur compounds from it in 1946, having antiseptic and hypotensive properties. Two more principles, having anti-bacterial properties, viz., allisatin I and allisatin II, were isolated from it in 1948.

Another interesting approach was opened with regard to *Peganum harmala* Linn. The isolation of the harmine series of alkaloids was reported as early as 1843, and studies on their constitution by Otto Firchu, and Perkin, Robinson, and Manske form a classic in the annals of organic chemistry. As a result of studies by S. Siddiqui, *et al.*, following the mildest chemical procedures, and alkaloid melting 180° higher than harmaline and yielding a phenolic base which melts about 50°C higher than harmalol, the corresponding phenolic base prepared from harmadine, a new base, harmadine, proved to be the principal alkaloid of the seed of *P. harmala* with an overall yield of 1.75% while no trace of phenolic base was found by S. Siddiqui and co-workers from three lots of the materials in the Punjab in Pakistan. This would suggest the possibility that harmaline and harmalol, according to Siddiqui, *et al.*, reported in the literature are entectic mixtures of bases, if it were not for the fact that the former

were synthesized by Perkin, Robinson and Manske, and found to be identical with the natural product. Siddiqui further observes:

> "It may well be that harmidine is an isomer of harmaline, the absence of which in the seeds may be due to varieties in soil and climatic conditions, but the study of *Peganum harmala* seeds from Iraq seems to exclude this possibility".

The seeds of *P. harmala* in Islamic medicine are prescribed for the explusion of the tapeworm. It has now been definitely established (Biochemical Journal, 264; 1934) that the alkaloids of the plant are toxic to helminths and protozoa. The highly vesicant principle, bhilawanol (a catachol derivative with a C15 H25 unsaturated straight–chain side in position 3), is effective in rheumatic pains.

Much work remains to be undertaken upon natural anti-diabetic drugs. Onion has been known to reduce the blood-sugar level. It is also likely that *Syzygium cumini* Linn. is effective against diabetes. Further studies are required upon the bitter gourd to establish whether the anti-diabetic principle in it acts independently of endogenous insulin. Some interesting development on hypoglycemic drugs is taking place in Central America.

One of the weaknesses of natural drugs from the higher plants, it is argued, is the poor microbial activity of such drugs. However, Lin Keng-Tao of the Institute of Materia Medica, Chinese Academy of Medical Sciences, has shown in a recent report that *Fructus schizandrae* which is commonly used as an astringent in traditional medicine, exercises therapeutic effect on certain types of viral or chemical hepatitis, particularly in lowering the elevated serum glutamic transaminase (SGPT) level and improving some of the symptoms in 68.2% cases. The accumulation of lipids in the liver is impeded, while the deposition of glycogen is increased.

The birth-control steroid, diosgenin, is dependent for its extraction upon *Dioscorea deltoides* Wall. Some important saponins like amelonin, digitonin, sarsaponin, tigorin, and trillium are also

obtained from *Chlorogalum pomeridianum*, *Digitalis purpurea* and *D. lanta*, *Radix sarsaparilla*, and *Trillium erectum* respectively.

We now come to folklore and the present-day screening of drugs. G.A. Cordell makes the observation with regard to anticancer drugs of herbal origin: "...in almost every instance where a plant has a reputed folklore reputation in the treatment of cancer, a compound displaying either *in vivo* or *in vitro* activity has been obtained". Cordell *et al.*, have studied the following plants and have isolated their active principles as regards anti-cancer properties.

Quinoids	*Jacaranda caucana*
Sesquiterpenes	*Acanthospermum glabratum*
	Michelia compressa
	Capsicodendron dinissi
	Centratherum punctatum
Diterpenes	*Rondeletia panamensis*
	Micrandra elata
	Baliospermun montanum
	Dioca occidentalis
	Aquilaria malaccensis
Simaronbolides	*Ailanthus excelsa*
	Ailanthus integrifolia
Steroids	*Asclepias albicans*
Miscellaneous compounds	*Amyris bipinnata*
	Linum album
	Cassia quinquangulata
Alkaloids	*Fagara zanthoxyloides*
	Zanthoxylum rhetsea
	Ervatamia heyneana

Two alkaloids isolated from *Catharantus roseus* Linn., vincristine (VCR) and vinblastine (VLB), have yielded favourable results with regard to Hodgkin's disease and choriocarcinoma and acute leukaemia in children respectively. Partial synthesis of both has been achieved by Dr. Atta-ur Rahman *et al.*

Another group of active principles against cancer has its origin in a plant growing in East Africa, *Maytenus oratus* Loes. This group is that of maytansinoids which includes some four maytanside esters attached to C^3 of the macrocycle as well as the free maytansides, maysine, normaysine and maysenine. Maysenine exhibits significant L 1210 and P 338 anti-leukaemic activity and powerful tumour-inhibitory properties against KB cells, mouse sarcoma 180, Lewis lung carcinoma, and Walker 256 intramuscular carcinoma.

The therapeutic aspects of herbal medicines have many facets. Hiroshi Saito, in his study of the pharmacological properties of *Panax ginseng* root, for example, has reported that the different fractions of its extracts exercise different actions, e.g., slight CNS stimulant action, CNS depressant action, histamine-like action, tranquillizing action, blood-pressure depression, blood-pressure elevation, etc. Once such a total study is extended to other plants, we may well check up why certain parts of a plant have been prescribed for certain ailments and which parts are rich in which active principles.

It has been estimated that roughly only 5% of the plant wealth has been studied. But perhaps this figure is on the larger side. The knowledge afforded by plants is almost infinite. The World Health Organization in 1977 realized this as is borne out by its report upon *The promotion and development of traditional medicine.* Among the reasons that it gave for the promotion of traditional medicine one was that of the intrinsic qualities of medicine.

> "Since traditional medicine has shown to have intrinsic utility, it should be promoted and its potential developed for the wider use and benefit of mankind. It needs to be evaluated, given due

recognition and developed so as to improve its efficacy, safety, availability, and wider application at low cost. It is already the people's own health care system and is well accepted by them. It has certain advantages over imported systems of medicine in any setting because, as an integral part of the people's culture, it is particularly effective in solving certain cultural health problems....(p. 13)".

This document's case-study of Egypt is rather interesting:

Ammi majus- a common plant in the fields and waste lands of Egypt - has been shown to contain ammoidin (xanthotoxin), ammidine (imperatorin), and majudin (bugaptene). The extracts of this plant have been shown to induce pigmentation in idiopathic leukoderma (vitiligo).

Ammi visnaga - another perennial plant, used in traditional medicine by ancient Egyptians in the form of a decoction and as a diuretic to treat renal colic - was recently analyzed and found to contain the two principles, khellin and visnagin. Khellin is useful in the treatment of angina pectoris and whooping cough and in the relief of ureteric and gallbladder spasms. It has been found to contain anthelmintic, antianaphylactic, antiatherosclerotic, anti-diabetic, and antiulcerogenic properties.

The report discusses herbs like *Nigella sativa* Linn. (*habbet el barakah*) and other plants which are under investigation in Egypt. Among these plants *Solanum laciniatum* is of special interest in that it contains alkamines which are steroidal in nature and which can be converted into steroidal hormones. This plant is the main source of solasodine which is being isolated industrially for the preparation of pregnadienone and used for the synthesis of various hormones.

It ought to be appreciated that the same herb may be used for specific treatment in one country, while in other countries the emphasis may be different. In the Philippines , for example, onion is employed in high blood pressure. Similarly, in the Sub-continent, the

rind of the pomegranate fruit is used, in conjuntion with aromatics like cloves, as an antidiarrhoeic and antidysenteric agent, while in Sumatra it is employed as an abortifacient. In Cuba the bitter gourd is used for the treatment of diabetes and chronic ulcers of stomach, whereas in the Sub-continent the value of bitter gourd as a hypoglycemic agent has come up for appreciation recently. Expanded vision with regard to the therapy of herbal medicines is one of the likely contributions when the folklores of different countries are collected. It is also possible that an ingredient may be present in much higher quantities in the species in a specific region and hence emphasis is placed upon therapy deriving from that ingredient.Thus, of the different species of mint, the Japanese mint, *Mentha arvensis var. piperascens* contains the highest percentage of menthol (70 - 90%). This variety, known as *Ryokubi*, has begun to be cultivated in Thailand, where by 1977 the yield of crude oil from it had reached 60 tons/year. This variety has been successfully introduced by PCSIR Laboratories, Lahore, into the Punjab.

In an illuminating paper presented at the 4th Asian Symposium on Medicinal Plants and Spices (Bangkok, 1980), Finn Sandberg discussed the results likely to be expected from an inventory of traditional medicines within a restricted area. He gives the illustration of *Oldenlandia affinis* (Family - Rubiaceae) which is indigenous to Zaire and Central African Republic at a distance of 20,000 metres. The herb of course bears different native names and is known in the local folklores for facilitating childbirth. Work on the herb by Lorens Gran in Norway has established that the herb contains the so-called Kalata-peptide, comprising 31 amino acids. This peptide is effective orally, and has potent oxytocic activity; and thus in this case the folklore medicine has been scientifically verified. Sandberg has also noticed that some plants cannot be cultivated outside their local ecological zones. An example is that of *Strychnos lianas*. But a herb like *O. affinis* can be easily cultivated.

An interesting example in this context is that of *Acorus calamus* (family - Araceae) which in the Sub-continent has not been prescribed for rheumatism. But in China the genera, *Acorus* and *Arisaema*, are reputed to be anti-rheumatic. Asaron and related compounds have been isolated from these species and have shown carminative, sedative, and analgesic effects. Triterpines from the corms of Arisaema have anti-convulsive, sedative, and analgesic properties. *Abutilon indicum* Linn. is put to different uses in the Sub-continent and Vietnam. Its leaves in the Sub-continent are considered demulcent, its bark astringent and diuretic, infusion of its roots febrifuge, and its seeds aphrodisiac, laxative, and demulcent. In Vietnam, on the other hand, the leaves are used as an emollient, stomachic, and antiperoidic. Decoction of its root is considered to be of use as febrifuge and also for the treatment of leukorrhoea. The leaves are also considered diuretic and the seeds are used against dysentery, carbuncles, and sore eyes. Work has been conducted upon *Rauwolfia serpentina* Benth and other species of the genus in Vietnam, where, interestingly enough, rutin has been extracted from a leguminous plant indigenous to that country, *Sophora japonica* Linn. Research is being undertaken in Vietnam on herbal drugs for affording relief against fatigue - a disorder inherent in the present civilization.

One of the most promising fields of natural drugs is that of activity. Shoji Shibata reported in 1980 that the intravenous administration of a medical preparation of glycyrrhizin, a saponin of the liquorice root, in conjuntion with cysteine and glycine, was proved by a double blind controlled trial to be effective against chronic hepatitis. Hemisuccinate of glycyrrhetic acid (Carbenoxylone) is orally administered in stomach ulcer. More recently, however, an antiviral activity of glycyrrhetic acid was reported and Interferon-inducing activity of a glycyrrhizin preparation were observed. Shibata believes that glycyrrhizin and glycyrrhetic acid are among the most promising natural products. Side-effects like

oedema and hypertension have been overcome through chemical modifications. The results so far obtained show that olean-12-en 3β, 30-diol chemically derived from glycyrrhetic acid by elimination of its 11-keto group and the replacement of 20- carboxyl with carbinol is one of the most promising compounds of this series showing separation of pseudo-aldosteronism from therapeutic such as anti-ulcer and anti-allergic effects.

Much of modern research on plant products has hinged upon folklore. Thus the Mexican cactus, *Opentia streptacantha* Linn. and herbs like *Tecoma stans* Juss. are being subjected to clinical trials in Mexico for diabetes mellitus. In the field of cardiovascular research, studies are being made on the seeds of *Casimiroa edulis* La Llave, popularly known as a hypotensor, and flowers from *Talauma mexicana* Don and *Magnolia grandiflora* L. are considered to be cardiotonics.

Passing from the general to the specific, on the occasion of this Conference, I thought that it might be worthwhile to write upon a theme of overriding importance in Islamic medicine, viz. upon the different sidelights of Islamic medicine from different aspects. I have also decided to present my personal experiences and impressions upon a drug which has gained considerable importance in the materiae medicae of the Sub-continent. This drug is based upon tamarisk. This drug has been specially selected as we have been able to prosecute the R&D effort required in its development on the basis of the knowledge bequeathed by the ancient and mediaeval masters of medicine and the conventional methods employed by the practitioners of Islamic medicine. This drug is being marketed under the trade name of Icterene and it is meant to minister to cases of jaundice.

Having briefly discussed the importance of herbal medicines in the treatment of diseases, I should now like to discuss my impressions about tamarisk. As I have said at the outset, I have chosen tamarisk because I have, by the grace of Almighty, been able to manufacture a drug for the cure of jaundice from a self-growing and wild plant of the

province of Sind in Pakistan. I am giving as much information as I can without any reservations and without withholding any information.

Tamarisk:

Its names in Islamic Materiae Medicae

The taxonomic name of tamarisk is *Tamarix gallica* Linn. syn. *T. troupii* Anct. Dyer. In Persian it is known as *ghazanjabin*, *gaz mazaj*, *ghadbar*, *ghazmazu*, *gazan-gaban*, *galaz*, *shur gaz*, *gaz* and *ma'in kalan*. Its Arabic synonyms are: *di manna*, *thamrat al-turfa*, *turfa*, *janz al-turfa*, and *thamrat al-turfa*.

The greater and lesser tamarisk varieties are denoted by the common designation of *gaz mazaj* or *gaz mazu*.

History of the Uses of the Drug

Tamarisk which occurs in the form of a shrub or small tree is indigenous to Asia, Africa, and Europe. Known as tamarisk in English, its French name is tamarise de France. Dioscorides (Book 1, 101) says that the plant which he designates as murike bears a seed like a gallnut. It is used as an astringent in Egypt and Syria, he states. Pliny calls the same tree tamarika (24, 41). It is the tamarix of Columella. Nicander named the tamarisk tree as mantie (prophetic). The Apollo of Lesbos has been represented with a bough of the tamarisk tree in his hand, and the Iranian Magi also prophesied with a spray of the tree in their hands. Herodotus and Pliny describe the plant in the light of similar use.

Coming to the synonyms of the tree in the Sub-continent, it was known as *jhavuka* in Sanskrit. In Hindi and Urdu it is known as *Jhau* and *bari mayn*. It is known as *pilchi* in Punjabi, as *jhavnu-jhadu* in Gujerat, as *jhavukam* in Malabar, as *siru savukku* in Tamilnadu, and as *sirasura* in Telugu.

It is probable that the galls of the tree have been in use in the Sub-continent since long, and the galls of the tamarisk tree were regarded as substitutes for oak-galls. The manna which drops from the tree is

collected in the month of June in Arabia and Iran. It is known as *gazangabin* or *gazanjabin* in Persian. The manna is not produced in the Sub-continent.

In Iranian works on medicine, the galls of the tamarisk tree are called the fruit, and the manna is described as a dew which falls upon this and other trees, notably the willow and oak, and becomes solid. The practitioners of Islamic medicine consider *gazanjabin* or the tamarisk manna to be detergent, aperient, and expectorant. According to Dymock *et al.* (Pharmacographia Indica, i, 160) it is the drosomeli of Galen. They further state:

> "In modern medicine manna is still used as a laxative; it slightly increases the action of the bowels, causing more frequent and softer stools without irritation. Its sweet taste makes it acceptable by children. The galls like those of the oak, contain tannic and gallic acids, and may be used as an astringent in the same manner as true galls".

The tamarisk tree has been included in the Islamic materiae medicae of the Sub-continent, from Ayurveda, although it has been known since Classical Antiquity.

Habitat and Identification

Tamarisk belongs to the family Tamaraceae. It grows throughout the Sub-continent as its names in different dialects should amply show. It occurs on riverine banks and near the sea-coast on sandy soils and in swampy areas. It is propagated by means of transplanting or sowing. Its tree, when small, grows rapidly and reaches maturity rapidly, and on maturity dies. It may attain a height of thirty feet. The diameter of its trunk is about three feet, and its boughs are curved. The bark of the fresh branches are slightly reddish and smooth, and bears small white marks. The bark of its foliage and the larger sprays is thin, greenish brown, and rough. Its flowers appear in the form of bunches and these are often white. The leaves are small. Its flowers do not appear separately as male and female. It is a hermaphrodite.

The taste of the tamarisk is bitter and astringent. One species of tamarisk is also prickly, and is prolific in South India and Rajputana. Since it bears many spines, it is called *Kanti Jhau* and *Kanti sharni* (i.e. the prickly tamarisk).

The tamarisk tree is of general occurrence in Iran and Afghanistan and is found in sandy areas in the Sub-continent, especially in the littoral areas and on the sea-coast.

Greek physicians have ascribed the occurrence of the tamarisk to river banks and have attributed four kinds to it.

1. The first kind is long, with its foliage like that of the cypress. It is called *athl* in Arabic. Its fruit is called *adhba* in Arabic, and *nanhi main* and *choti ma'in* in Urdu.
2. The second kind is similar to the first, but does not bear any flowers.
3. This kind has scantly foliage and bears white flowers with a slightly reddish tinge. Its flowers are in branches and present an appearance of oak flowers. It is called *gaz mazaj* and *bari ma'in*. The taste of the flower is pungent and the blossoms possess a little scent. It is greatly favoured by the honey-bee.
4. This variety bears blossoms the size of *Buchanania latifolia* Roxb. and black pepper. The colour is greenish. No flowers appear upon it. It is used for dyeing purposes. This kind is not to be found in Iraq and Iran.

Some writers, on the other hand, say that it comprises only two kinds.

i) This kind is large and cultivated. Known as *athl* in Arabic, it is known in the Sub-continent as *frash*. Its fruit is called *'adhba'*. The people of the Sub-continent designate it as *choti ma'in*. In Urdu and Hindi it is *lal jhau* (red tamarisk).

ii) This variety is smaller and wild. Its flower is reddish-white. It is known as *turfa'* in Arabic, *gaz* in Persian, and *jhau* in Hindi.

Tamarisk Constituents

The galls of *Tamarix gallica* contain as much as 40% tannic acid (Kirtikar and Basu, Indian Medicinal Plants, Allahabad 1933, vol. 1, p. 248). *Tamarix aphylla* Karst. syn. *T. articulata* Vahl galls contain 36.8 - 43.9% tannin; its bark contains 10% tannin and the wood of the tree 1% tannin. The galls contain levulose and glucose, dextrin, and moisture.

As should be evident from the foregoing, the Sub-continent tamarisk galls are very rich in tannin. British Pharmacopoeia recommends the use of the galls in a powdery form. They are equally rich in tannic acid. Gazangabin or tamarisk manna contains sucrose, invert sugar, levulose, glucose, dextrin, and water.

Description

Gaz mazu, i.e. the tamarisk galls, is much smaller than the true gall; it is three-angled, knotted, and ugly in shape. It has a cavity in the centre which is sometimes filled by mosquitoes or flies, but generally the cavity contains excrementitious matter only. The manna occurs in the form of small grains. When fresh, it is white, but it has the tendency to become viscous and form a thick liquid like honey. Material like this is produced upon willow and oak in consequence of the puncture by an insect. According to Ehrenberg, the insect which attacks the tamarisk is *Coccus manniparus*. The Persian word, *Gazangabin*, means tamarisk-honey. According to Knecht, in the nineteenth century, it was applied to the manna which was collected in the mountainous districts of Chahar Mahal and Faridan from two species of Astragalus which is a leguminous plant.

Tamarisk manna is collected towards the end of June. According to Aitchison, it is cultivated in Khurasan, where it is designated as *siah chub*. Manna-bearing tamarisk trees are abundantly found in Siah Kuh and Sufayd Kuh and in the Ardiwan Pass. Elsewhere the tree is found to grow in saline soils and by the banks of rivers. It is cultivated occasionally as an ornamental plant in gardens (A.K. Nadkarni,

Indian Materia Medica (Bombay 1976), vol. 1, p. 1194). Tamarix galls are moderately emollient, expectorant, and detersive with regard to blood. It is therefore incorporated into anti-tussive and cough medicines as well as in drugs promoting aperience. Its chief advantage is that it promotes the passage of stools without any attendant irritation or burning sensation. Not being repulsive in taste, it is regarded particularly useful for administration to children, and can be administered in conjunction with milk. It is also employed as a substitute for oak-galls. (Idem, Ibid.) Being revulsive, the leaves of the tree which are soft, resolve inflammations and in dyspepsia they promote the expulsion of stools from the mesentery and the liver. It abates the hardness of the spleen. It is a stomachic and liver tonic (*Khaza' in al-Adwiyah*, vol. III, pp. 313 - 15). All of its constituents are tranquillizing. Drinking of water in a tamarisk bowl has been held to be useful in the inflammation of the spleen. But it is also suggested that this practice should be continued till the termination of the convalescent period.

Ibn-Sina believes that tamarisk acts as a detersive, astringent, and resolvent without exhibiting any intense desiccation. Its aqua, according to him, acts as detergent and desiccative, and it is this desiccative property which promotes constipation which, however, is slight, because it is cold. Its power to resolve is not excessive. Insofar as its desiccative power is concerned, it is not possible for desiccation to be promoted without any capacity being possessed to act as a resolvent. It is only after the removal of humidity that resolution helps to promote desiccation.

Tamarisk is also used in the cure of jaundice. When bile is retained in the gall-bladder and acts as an obstruction, a decoction of tamarisk-root with vinegar is useful. The juice of its leaves and flowers is also advantageous in jaundice.

Temperament

Tamarisk is cold and dry in the first degree. Some physicians hold

it to be dry in the second degree. Shaykh Ibn-Sina has said that it is cold and dry in the second degree. Being bitter it should be hot and this hotness is due to its bitterness. Some investigators have openly said that it is hot and dry.

Use and Therapeutic Action

Tamarix has been in use in the Sub-continent since ancient times. Physicians have employed it in the treatment of pseudodysentery in which case a decoction of its leaves and soft branches is useful. (*Khaza 'in al-Adwiyah*, vol. III, pp. 314-15).

Dioscorides regards its fruit to be useful in the ailments of the eye and the mouth. Ibn Biklarish al-Isra'ili believes that it is useful as a corrective for irregular periods (Ibn al-Baytar, *Jami'li Mufradat al-Adwiyah w-al Aghdhiyah*). All these aspects pertain to the use of its leaves, root, branches, fruits, and flowers.

It has been recommended for external use also, e.g. in the cure of the ailments of the spleen, oedema, and hot inflammations. Some of its other uses are:

i) Cicatrization of wounds due to smallpox by sprinkling a powder of its dried leaves upon the wounds.
ii) Its fumigation brings about the drying of wounds. It also dries haemorrhoids in piles.
iii) An infusion of its root and leaves is of utility in prolapsus ani and leucorrhoea.
iv) Being astringent, a decoction of the herb is used as a gargle in the irritation of the throat, boils and itch in the mouth.
v) It has been recommended in the cure of decomposed and putrefied flesh and as a gargle in pyorrhoea and toothache. The ash of the gall removes the yellowness of the teeth.
vi) It acts as a styptic if the flow of blood from an organ cannot be controlled. It stanches the flow, if sprinkled upon the organ.
vii) It destroys the lice, if the head is bathed with a decoction of its leaves.

viii) Fumigation with its smoke dries the humid pox and other humid wounds. Tamarisk leaves, after drying and powdering, will expel malflesh. In this case they are applied externally.

ix) A powder of tamarisk leaves soothes wounds due to burns.

x) Physicians have recommended the chewing of its leaves for curing spongy gums.

xi) For external use a poultice is made from its resin and applied to boils which have become chronic, according to the practitioners of Islamic medicine.

xii) It is used as a tonic for the hair. The preparation used as hair tonic is prepared as follows: Fresh tamarisk root is heated with an equivalent weight of seasame oil and twice its weight of water. When all the water has evaporated, the remaining liquid is strained.

xiii) Decoction of tamarisk root is recommended in colds.

xiv) Poultice prepared from the tamarisk bark and pomegranate peel, if ground finely, is effective in abating the flaccidity of breasts in women. It should be applied twice in 24 hours.

xv) Women suffering from leucorrhoea are advised to sit in a bath containing its decoction (*Khaza' in al-Adwiyah* vol. III, 314-15).

Chemical Composition

Berthelot submitted to chemical examination the manna obtained from Sina'i. It was a thick syrup and was found to comprise cane-sugar, inverted sugar (levulose and glucose), dextrin, and water. The gazangabin sample obtained from Iran and chemically analyzed by Ludwig was found to contain dextrin, uncrystallizable sugar.

The galls of tamarisk have as much tannic acid as those of oak.

Prescription and Administration

The drug has an adverse action upon the stomach, but this action is made wholesome and corrected by honey and oil. Its substitute is

athl which is also known as *frash*. The physicians of Lucknow recommend a weight of 4 mashas in decoctions of the herb. Some have recommended a dose of 5 to 7 mashas.

Drug Preparation

I am not in a position to discuss the Muslim contribution to the art of drug-making except to state here that they continually searched for new sources which could be brought to bear upon therapy, making the drugs progressively more efficacious, and providing all kinds of facilities to patients. They not only used their imagination but also at every step took full advantage of the treasure-house of experience which was left to them by their predecessors.

Among the achievements of Muslim physicians is their discovery of salts in herbs. They obtained salts by heating the plant or its particular part and scouring them from the ash. Such salts are obtained from barley, *Lycium barbarum* Linn., radish, etc. The salts have been therapeutically shown to be very effective. The procedure followed for the extraction of the minerals is as follows:

The plant or the part of the plant containing minerals is incinerated and the ash stirred in water is kept standing for 2-3 days. This liquid is then strained with a muslin cloth. A basin is placed below, so that the water containing the minerals may keep on dripping and collecting in the basin. This filtrate is again poured on the ash and the process is repeated twice or thrice. Almost all the minerals are thus extracted. The water containing the minerals is then evaporated and the salts are then dried and stored.

Another procedure is to put the ash into a basin and to pour water upon it, agitating it by hand or mechanically. The ashy water is then left undisturbed for some time and then filtered. The water is boiled, leaving the salts which are then dried.

Both procedures are virtually the same but for small differences. Salts from *Lycium barbarum* Linn., barley, and radish are obtained in this way.

Hamdard has modified the process according to modern bulk methods employed for filtration, boiling, etc.

The process is now known as the Hamdard process. Salts obtained by this process are effective against jaundice.

These minerals have been analyzed in the laboratories of Hamdard and the results are as follows:

Icterene is an inorganic chemical compound which Hamdard obtained from *Tamarix dioica*. Years of chemical research and therapeutic evolution have proved Icterene to be clinically a scientific cure for jaundice. This is probably achieved by expelling the obstruction of the bile.

Icterene has also been successfully employed in oliguria or wherever diuresis is required. In mild infective and febrile states it acts as a diaphoretic and lowers the body temperature.

Clinical experiments of Hamdard have led to the same result, i.e. the disappearance of yellow colour within 3-4 days and it is hardly ever necessary to continue the treatment for another three days.

The chemical analysis of Icterene carried out by Prof. Dr. Georg Hahn in the PCSIR Laboratories at Karachi has shown the composition of the compound to be as follows:

1. Moisture, 79%
2. Organic matter, 2%
3. Cations:
   Iron, 8.07%
   Cobalt, 1.50%
   Calcium, 1.50%
   Magnesium, 0.17%
   Sodium, 1.70%
4. Anions:
   Chloride, 28.9%
   Sulphate, 31.7%

Icterene Dosage

A course of two tablets three times a day for adults in between meals for three days is usually enough to bring about clinical cure, but in many cases 8 tablets in 24 hours can be given without causing any harm. In the event of a satisfactory response not being obtained, the period of treatment may be enhanced by another 3 days.

The patient should, while under treatment, drink plenty of liquid material, e.g. fruit (particularly citrus) juices, glucose water, etc. Meat and fats are to be totally avoided.

The drug has not given to known toxic or adverse side-effects.

The presentation of the compound is in tablet form. Islamic medicine undoubtedly possesses efficacious treatment against jaundice, while allopathy has yet to find a therapeutic agent for its cure. We are all too well aware of the fact that the jaundice patient, whether treated by allopathy or Islamic medicine, has to be stashed up in a hospital or private clinic for weeks and, in certain cases, for months. The patient is given saline dextrose drips which at times affects the pancreas adversely.

The tamarix fruit (particularly that of *Tamarix indica* Linn.) is considered a refrigerant, digestive, carminative, laxative, and useful in diseases caused by deranged bile. Infusions of the fruits are also given as draughts in febrile diseases.

From what therefore has gone about tamarisk we are led to arrive at the following conclusions:

(i) Nature has provided cure for diseases, and plants specific to certain regions offer therapy in particular regions against diseases that are prevalent in those regions. Thus the inhabitants of cold regions are prone to suffer from gout and rheumatism, and we have thus *Colchicum autumnale* (*Surinjan*) growing throughout the temperate regions, e.g. Central Asia and Western Europe. The climate of south and western India is hot and humid, and the wood of the sandalwood tree allays heat and pruritus, acting as a diaphoretic.

Likewise, medicinal folklore has antidotes for scorpion and, snake-bites and alexipharmacs. And this is what the practitioners of Islamic medicine have also said.

(ii) Treatment by means of natural drugs enshrines thousands of years of experience and rather than refuting them scientific studies have confirmed their efficacy. We have the example of tamarisk.

(iii) It has not been possible for us so far to investigate how the practitioners of Islamic medicine arrived at the idea of extracting salts from the ashes of certain plants. No doubt, one of the chief merits of wheat lies in the fact that, besides being a protein and vitamin source, it has magnesium, manganese, zinc, iron, and copper besides arsenic oxide present to the extent of 0.03 mg/ one kg grains. *Sha'ir* (*Hordeum vulgare* Linn.) has 55 mg of arsenic per 100 g dry plant; these instances show that the presence of minerals is essential for proper metabolic functioning.

The extraction of mineral salts from plants may appear strange to Western science, but so mysterious are the workings of the human body that these salts inexplicably possess great therapeutic value. Dr. Georg Hahn, who was head of the Organic Chemicals Division at the Karachi Laboratories of the Pakistan Council of Scientific and Industrial Research, carried out work under the guidance of Dr. Salimuzzaman Siddiqui, F.R.S., and submitted a report upon the composition of salts from *Tamarix* spp. which we have summarized in the foregoing paragraphs.

The minerals which we have obtained from *Tamarix* spp. and which may be regarded as a patent, has been obtained according to the traditional methods, but for the fact that for mass production we have had to introduce unit operations calling for large-scale design. We have yet to see whether these minerals act (a) by effecting some change in blood and curing jaundice; (b) by the enlargement of the bile duct, thereby removing or evacuating the bile; or (c) whether it acts as a bacteriostatic agent. We need to carry out pharmacological studies

upon this point, and these studies we have not been able yet to carry out.

All that I can say here is that I have so far tried Icterene on about 5,000 jaundice patients and in not one patient have I been able to trace side toxic effects. It has no toxic effects, and I know for certain that allopathic practitioners have prescribed Icterene to patients in Karachi and elsewhere.

(vi) It is well-known that in control experiments upon animals, especially dogs, jaundice cannot be induced. When we therefore conduct *in vivo* experiments, we shall have to experiment upon human beings.

(v) The work on tamarisk gives rise to a series of questions: How much work has been done on other plants in the manner of the work done upon *Tamarix* spp.? Where has such work been done or is being done? Who has done it? Not only are these questions important, but a far more important question is as to how many plants there are on the earth on which such work ought to be done for the well-being of the humankind. We have not even taken the trouble of identifying the plants described by the Masters comprehensively.

This point demands the full attention of scientists and chemists.

I would deem it a privilege if the scientists, chemists, and doctors, present at this representative gathering make this extremely effective and efficacious drug which is a product of ancient wisdom and modern research, an object of their deliberations.

I feel that, if the participants of this Conference, express their views about the possible mechanism through which this drug acts, we should be in a position to stimulate interest in Islamic medicine and the venues it opens for further research. We know, for example, that in modern Western therapy, mineral salts are gaining in importance and the objective is to administer mineral salts with vitamins in an absorbable form; we have the examples of ferrous fumarate and ferrous sulphate. Many salts like zinc sulphate act as potent antifungal

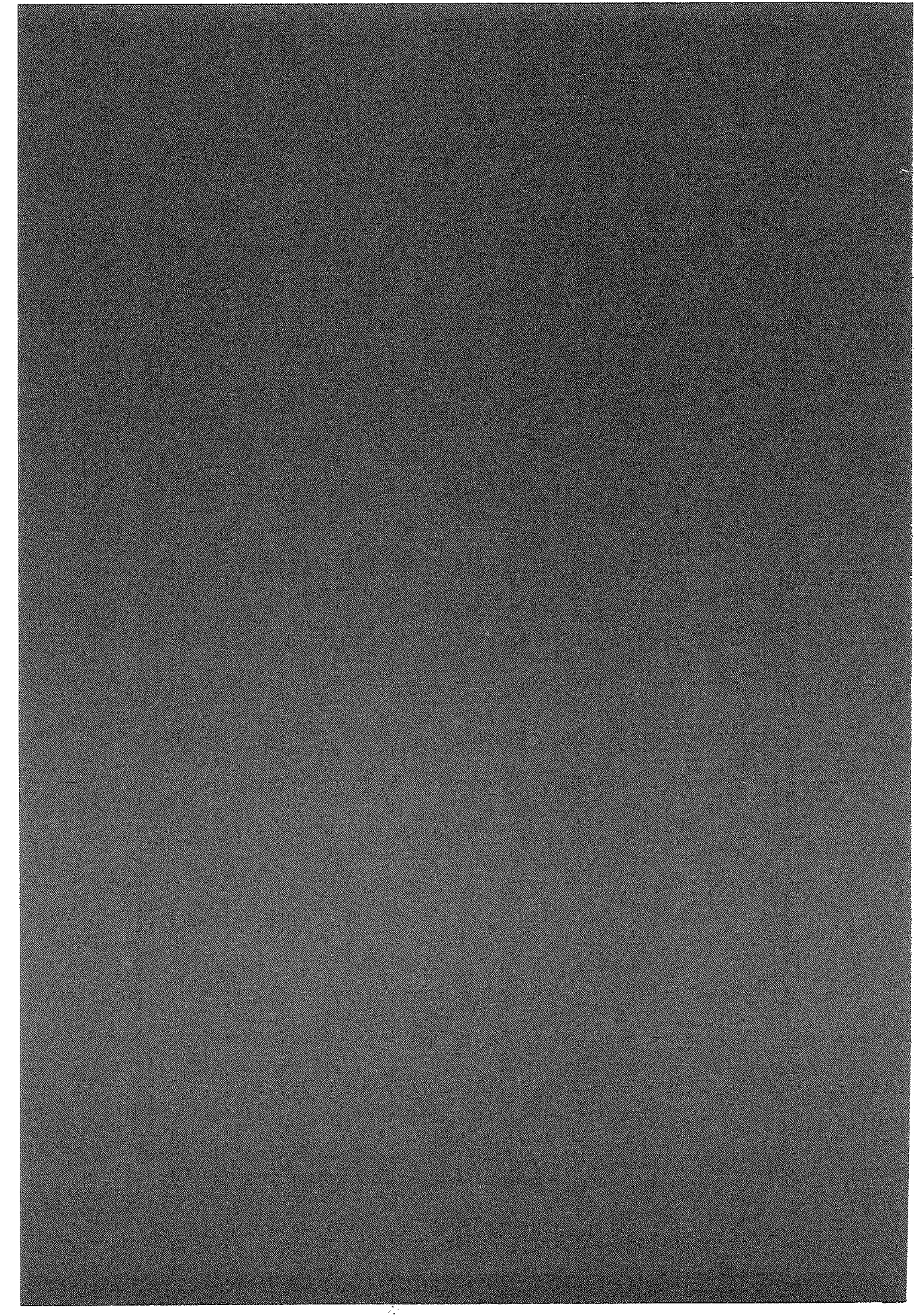
agents; the same is true of certain sulphur compounds. Homeopathy, to a considerable extent and Biochemic almost, depend upon the administration of mineral salts. Perhaps Icterene through a biochemical process permits the evacuation of bile and promotes diuresis. Many other plants rich in minerals like radish also act as diuretic agents. Modern medicine employs citric acid compounds for diuresis in jaundice. Once the mechanism has been worked out, it might be possible to work upon other diuretic agents like water-melon and *Ribes nigrum* Linn., the latter being used as a diuretic and detergent in Germany. These are only two cross-examples. There are other plants which require investigations upon their diuretic properties and use in jaundice. I feel it sure that, if work is continued upon plant drugs, we should be able to come across many patent therapeutic agents from the Vegetable Kingdom.

There are thus infinite possibilities for drug research, which, so to say, has the sky as its limit.

TRADITIONAL MEDICINE AND MODERN PHYTOCHEMICAL RESEARCH

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TRADITIONAL MEDICINE AND MODERN PHYTOCHEMICAL RESEARCH*

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For a long time it appeared that no consensus could be reached between traditional medicine, meaning essentially phytotherapy, and modern drug therapy. In this respect a great change of attitude has occurred and one notes also in the USA a slow reversal of trend.

What are the reasons for that?

Many reasons can be given, the negative ones being:

1. The financial expenditure for the development of a market-ready synthetic drug is out of proportion to success achieved. Today one has to reckon with an average of 8000 synthetic products per marketable drug.
2. The development of "tailored" synthetic drugs - so-called "drug designing" - despite individual successes, is still in the beginning.
3. Increasing awareness that with introduction of synthetic products there is threatening increase of drug side effects.

The positive reasons are:

1. The discovery of revolutionary novel methods in plant analysis.
2. Reverting back to natural products as ideal models for the development of newer drug effects.
3. Awareness that we need also drugs against chronic diseases and for prevention.
4. Improved information on the plants already investigated and particulars of their biological activity with the help of computers.
5. Improvement of international co-operation by establishing

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* Bulletin of Islamic Medicine, 1:542-545, 1981.

societies, exchange of scientists and organizing symposia.

Despite these positive reasons, which have led to a process of rethinking and introduced a trend reversal, there is still a lot of difficulty, criticism, and prejudice that confront a more efficient promotion of medicinal plants research.

I name them:

1. The complexity of constituents in a plant "the inconstant conglomerate".
2. The often fantastic spectrum of indications.
3. The considerable subjectivity in judging successes and lack of double blind studies.

A great handicap in addition that stands in the way for the introduction of phyto-preparations is the Dogma of Monosubstances. The supporters of this dogma fail to realize that it is the therapeutic effect which is important and not the activity of the monosubstance as proven by pharmacological tests.

However, I would like to advocate the thesis that a real progress in the field of systematic medicinal plants research can only be achieved if the individual active principles are isolated and their effects demonstrated by conventional methods.

I want to illustrate these efforts by giving you three examples taken from our research programme. They are primarily meant to clarify:

1. that folk medicinal application does not help in all cases in the search for active principles,
2. that one cannot dispense with special methods of pharmacological investigation,
3. that the knowledge of a new active principle can provide stimulation to drug research as a whole.

Example 1: ***Annona squamosa***

There is an abundance of chemical and pharmacological investigations on this plant. Various structure types, derived from dopamine, have been found so far in the Annonacee. The folk-medicinal use is manifold stretching from its use as tonic to an anticaner drug though conspicuous effects are absent. An obscure literature reference reports on a cardiotonic activity and we pursued this lead.

We used the tests of Prof. Reiter on the isolated papillary muscle of the guinea pig for localising and isolating the active principle. It was possible to enrich the active fraction through extraction with butanol. Polyamide and Sephadex - chromatography resulted in the final isolation. The active principle was enriched 20-fold in the fractions 47-80.

Subsequent to the elucidation one was led to ask the question: Why was this compound not found out in earlier investigations; An explanation could be considered:

1. the low concentration
2. the considerable instability
3. the lack of test methods in micro scale
4. the masking of the cardiotonic principle by other activity profiles.

The example shows that it is possible to isolate new active principles from plants with a wide spanning indication spectrum employing refined pharmacological and chemical methods.

The discovery that higenamine possesses a positive inotropic activity, reaching against β-receptors, leads to the next question. Do other tetrahydro isoquinoline alkaloids also possess the same activity since this structure type is not uncommon in the plant kingdom?

This effect is not restricted to higenamine but can be observed in cases where one or two hydroxyl groups, as in tetrahydropapavero-

line, are present in the benzyl portion of the molecule. The dopamine structure in the isoquinoline part is however, essential.

This information is of general pharmaceutical interest for the synthesis of analogous compounds.

Example 2: *Colobrina asiatica*

The second example shows that a systematic pharmacological screening often leads to a surprising result despite lack of concrete clues from folk-medicine. *Colubrina asiatica* is used in the Philippines for external treatment of skin diseases. In the Fiji island the leaves are considered as an ideal washing agent.

O-Methyl-Dauricin, a tetrahydro isoquinoline alkaloid, was isolated from the bark of this plant by Tschesche. The drug exhibited a conspicuous sedative effect on being subjected to pharmacological screening. A similar activity was exhibited by the drug *Zizyphus jujuba*, which likewise belongs to the Rhamnacee-family and is known in Chinese medicine as a sedative drug.

Two new saponins, both containing ebelin lactone as the common sapogenin, have been isolated from the leaves of *Colubrina asiatica* and their structures elucidated. These differ from the zizyphus saponins only in their sugar composition. It was shown that even with a dosage of 1 mg/kg an activity quotient of 0,3 - 0,6 was exhibited measured on the spontaneous motility of the mouse. This tranquillizer effect was confirmed by experiments on animals pretreated with amphetamine and chlordiazoepoxide. This action is very high and lies above that of the valepotriates of valeriana. The lethal dosage of 1.72 g/kg permits an extraordinary therapeutic width.

This sedative action is completely new and surprising for compounds of the saponin series. These substances may possibly serve as a basis for new preparations.

Example 3: *Silybum marianum*

The last example differs from the two previous ones. This is a classic demonstration of the isolation of an active principle, with the help of pharmacological testing, from a drug used in therapy since millinea and its subsequent basis for a new drug preparation.

Silybum marianum was already therapeutically in use since antiquity due to its effectivity on liver and bile.

In order to locate the active principle, we used a liver damage test. The liver will be damaged by an agent, which is toxic to the liver f.i. tetrachlorcarbon. If one administers afterwards a sleeping drug such as Urethan, one notices a prolongated sleeping time due to the reduced degradation of Urethan. A drug, which has protective activity, must be able to antagonize this prolongated sleeping time to a certain extent. In the case of Silybum a flavonoid fraction enriched with Silymarin, had an inhibition effect of about 60%.

With the help of this test, we were able to locate the active principle in the flavonoid fraction. We have isolated three compounds, which showed about the same activity and represented the active principle of the drug. The compounds Silybin, Silkydianin and Silychristin (= Silymarin), belong to the new class of flavonolignans.

Meanwhile about twenty different tests, a clinical trial and a double blind study have been performed. The three flavonolignans are now on the market as Legalon (R).

One experiment was particularly informative. This is the phalloidin test. Phalloidin is highly toxic to the liver. Silkymarin protects the liver cell to 100% if given one hour before the phalloidin administration. Even when Silkymarin is given ten minutes after the phalloidin administration, one finds a 100% protection against phalloidin.

Silkymarin has two mechanisms of activity on a molecular - biological base. It tightens the cell membrane and occupies the recepters on the outside cell membrane.

By this it hinders the toxic agents to penetrate. The second action is on the polymerens B. It stimulates the RNA synthesis and by this the synthesis of proteins.

CONCLUSION

The following points emerge from the three examples from our own research work:

1. With the methods at our disposal today it is possible in each case to find active principle and elucidate its structure in drugs whose effects have been proven clinically or known in folk-medicine, even when the substance is present only in a low concentration and when the substance is very unstable.
2. Experience of folk-medicine plays one important role in the discovery of medicinal substances. As shown by two examples, systematic pharmacologic screening of drugs without any direct indications can also lead to new interesting active principles.
3. Pharmacological screening must be systematised and made available to laboratories which do not have these facilities at their disposal. In this context it seems to us necessary that laboratories without these possibilities look for partner institutes abroad and agree upon common research projects. This collaboration could start on a private basis and a later official support should be aspired for.

THERAPY WITH DRUG PLANTS

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THERAPY WITH DRUG PLANTS*

Prof. Dr. M. Darwish Sayed
EGYPT

The knowledge about the drug plants of the Ancient Egyptians came to us through the offerings of the dead found in tombs, the earliest designs and scorptions on the walls of temples, the records available in such Papyri as Ebersa Papyrus (1500 B.C). These offerings, designs, inscriptions, Papyri and writings show that old Egyptians were acquainted with a great number of drug plants and their products.

Moreover, a lot of drug plants were recorded by Romans and Arabs. In fact some books written by old Arab scientists are still recognised as useful references in the field of drug plant therapy. Amongst these Arab scientists are Ibn-Sina, Ibn Bitar, El-Razy, Daoud El-Antaki and others.

The recent forward step taken by W.H.O to recognise medicinal plants as an effective source of therapeutic agents gave a significant push to international concern and research in the field of therapy with drug plants.

Examples of Drug Plants already Industrialised

1 - *Ammi majus*

The plant is common in fields and waste places of Egypt. The fruits are used as a public remedy for the treatment of leukoderma. The first to describe this drug and to use it in the Arab countries was Ibn El-Bitar who lived in the 13th century. The chemical analysis of

* Bulletin of Islamic Medicine, 3:389-392, 1984.

the fruits led to the isolation of ammoidin (Xanthotoxin), ammidin (imperatorin) and majudin (bergaptene), to the presence of which is attributed the activity of the drug.

Meladinine a drug containing both ammoidin and ammidin, in the form of tablets and paint by Memphis Co., is found to increase the pigmentation of normal skin and induce repigmentation in idiopathic leukoderma (vitiligo).

2 - *Ammi visnaga*

The perennial herbaceous plant is common in waste places of the Nile-Delta. The fruiting pedicales are used as tooth-picks and the fruits, in the form of decoction, as a diuretic in renal colic, by the Egyptian public since the days of Ancient Egyptians. The fruits have been found to contain two bitter principles, khellin and visnagin. Khellin is useful in the treatment of angina pectoris, whooping cough and to relieve spasms of ureter, kidney and gall bladder. Khellin was also found to have anthelmintic, anti-anaphylactic, anti-athero-sclerotic, anti-diabetic and anti-ulcerogenic effects. Khellin was introduced in therapeutics since 1945 under various pharmaceutical forms by Memphis Co. known by the trade name of Lynamine. Several formulations (ampules, drops, tablets, potions, suppositories) containing Khellin are produced by Memphis Co. and Misr Co.

3 - *Cymbopogon proximus*

An ascending densely tufted perennial grass, common on hills and rocky grounds of Elba and the sandy coasts of Red-Sea in the Southern boundaries of Egypt. The entire dried herb known as "half bar" has been used for centuries by the Bisharin and Ababda tribes of Aswan Province in the form of a decoction to produce diuresis, to allay colicy pains, to help the removal of small stones from the urinary tracts and as an antipyretic in fevers. Recently the active principle

"Proximol" has been isolated by the close co-operation between a team of scientists in the Faculty of Medicine (Cairo University) and the National Research Centre. Proximol (a sesquiterpenoid) possesses unique antispasmodic properties as it produces relaxations of the smooth muscle fibres without abolishing the propulsive movement of the tissue. The success of proximol in the propulsion of renal and ureteric calculi is attributed to the pharmacological characteristic where ureteric dilation occurs without paralysis and preserving the propulsive waves. It is quite a safe drug and prolonged use in the recommeded therapeutic doses did not show any side effect. The drug is produced by Kahira Pharmaceuticals and Chemical Industries Co. in the form of drops and tablets.

4 - *Nigella sativa*

The seeds of *Nigella sativa* known in Arabic as "*Habbet el Barakah*" are used, in folk medicine, by the Egyptian public as a diuretic and carminative, while its expressed oil is used in asthma, respiratory oppression and coughs. The active principle "Nigellone" has been isolated from the volatile oil fraction and is found useful in the treatment of bronchial asthma.The drug "Nigellone" is produced by Misr Co.

5 - *Aloe vera*

The aqueous extract of *Aloe vera*, an ornamental plant cultivated in more than 100 acres, has been recently produced by El-Nile Co., under the trade name "Aloderm". Aloderm produced in the form of cream and lotion promotes healing of wounds, burns including sunburn, radiodermatitis and ulcers and helps in acne vulgaris treatment.

Examples of Drug-Plants under Investigation for Industrialization

1 - *Urginea maritima*

Squill bulb represents a drug which is known to mankind since antiquity. Ancient Egyptians used the bulbs and their extracts (as vinegars) in treating combat hydropsy, one of the striking symptoms of cardiac failure. The bulbs contain reasonable percentage of the cardiotonic glycosides. The plant grows abundantly wild in different localities. Since the last decade, the drug industry in Egypt depends totally on the squill for the preparation of galenical and pharmaceutical products. The purified glycosidic constituents are used in the treatment of cardiac diseases. The glycosides have the advantage of being useful in treatment of cases refractory to, or no longer respond to, digitalis and strophanthus therapy. The annual consumption of cardiac glycosides in Egypt is very high.

2 - *Phytolacca americana*

Earlier investigations of the roots resulted in the isolation of a saponin whose physiological activity was correlated in all respects to the reported physiological activity of the roots. Recently the saponin was found to possess a high spermatocidal activity. A clinical application (as ointment) of the toxic substance on 100 fertile cases eager to secure contraceptive and followed up for a period of one year revealed that none of the individuals complained of any discharge or irritation and no conception took place. The substance is recommended as an effective local contraceptive drug.

3 - *Euphorbia* species

The genus *Euphorbia* is represented in Egypt by about 40 species. A number of alleged folkloric uses has been ascribed to several *Euphorbia* species which are known by their production of substances with several biological activities. *Euphorbia* species - most of which

possess antileukaemic activity - are used widely in folk medicine for treating cancer of stomach, liver and uterus. Its use in treatment of asthma as well as for skin diseases were reported.

4 - *Glycyrrhiza glabra*

The roots and rhizomes of the plant growing in Egypt were investigated for their glycerrhizine content. The glycoside is an important cortisone substitute without the side effects resulting from withdrawal of cortisone. Standards of exotic liquorice are cited in many Pharmacopoeias.

5 - *Cynara scolymus*

This edible plant is widely cultivated in Egypt. The extract of *Cynara* causes a simultaneous drop in blood cholesterol and stimulates the liver and kidney functions. It produces diuresis with increased elimination of blood nitrogen which recommends its therapeutic use in biliary diseases and in cases of nephritis.

6 - *Solanum laciniatum*

Solanum laciniatum is very rich in alkaloidal glycosides. Its alkamines are steroidal in nature, which are now very valuable from the economical point of view in the pharmaceutical industry, as it can be converted chemically to steroidal hormones.

7 - *Lawsonia* species

The leaves of this plant were recommended by ancient Egyptians to treat fungal infections of the skin. It was also stated that the leaves should be fermented over night before use.

The recent phytochemical investigation revealed the presence of a compound given the name Lawsone which proved to be a safe and effective antifungal. It is to be mentioned that to isolate this compound, however, the leaves have to be macerated in water over

night before extraction (fermentation prior to extraction), the fact which complies with the old Arab observation.

O

OH

O

2-hydroxy-1,4 naphtho quinone

LAWSONE

Need not to mention that the examples cited are by no means, and can never be a comprehensive list of the medicinal plants, now in use, nor the only known sources of important therapeutic agents.

The present situation, whether at the national, or international level, arouses a very important question that needs a sufficiently accurate and clearing answer, which is: What is, or could be the future of therapy based on medicinal plants and/or their active constituents?

A lot of factors make the answer of this question a must, of which the following are the most important factors:-

a - Medicinal plants contributed a lot in the field of therapeutic medicine. In fact some diseases remained incurable for a long period of time, until an effective and safe compound was isolated from a medicinal plant and was the only and still is the best curative agent.

b - The range of safety is very encouraging in most of the cases, using medicinal plant constituents.

c - Some very important complex compounds can be synthesised from starting materials, isolated from certain medicinal plants, thus achieving economy and saving time and effort e.g. vitamin A

from citral aldehyde (*Eucalyptus citrodora*), cortisone from saponins of different plants e.g. agave, solanum etc.

d - A lot of important plant constituents were still unsubstitutable by synthetic compounds i.e. have never been successfully synthesised if any e.g. volatile oils, enzymes.

Accordingly, it can be concluded that medicinal plants must be exposed to a thorough and comprehensive investigation from all aspects to explore their therapeutic property or properties. The Arab world is known to be rich in medicinal plants whether cultivated or wildly grown. For this purpose I recommend establishing an Institute for Medicinal Plants, which could be responsible for the following targets:

1- Exploration of Medicinal Plants growing in the Arab region.
2- Establishing a herbarium where authentic samples can be kept as references for identification of unknown samples.
3- Phytochemical and Pharmacological investigation with reference to traditional use.
4- Establishing a pharmacopoeia for recognised medicinal plants.
5- Industrialisation of medicinal plants which prove to be of therapeutic importance.
6- Establishing means of communications between different schools interested and/or concerned with medicinal plants to encourage exchange of experience and researches.

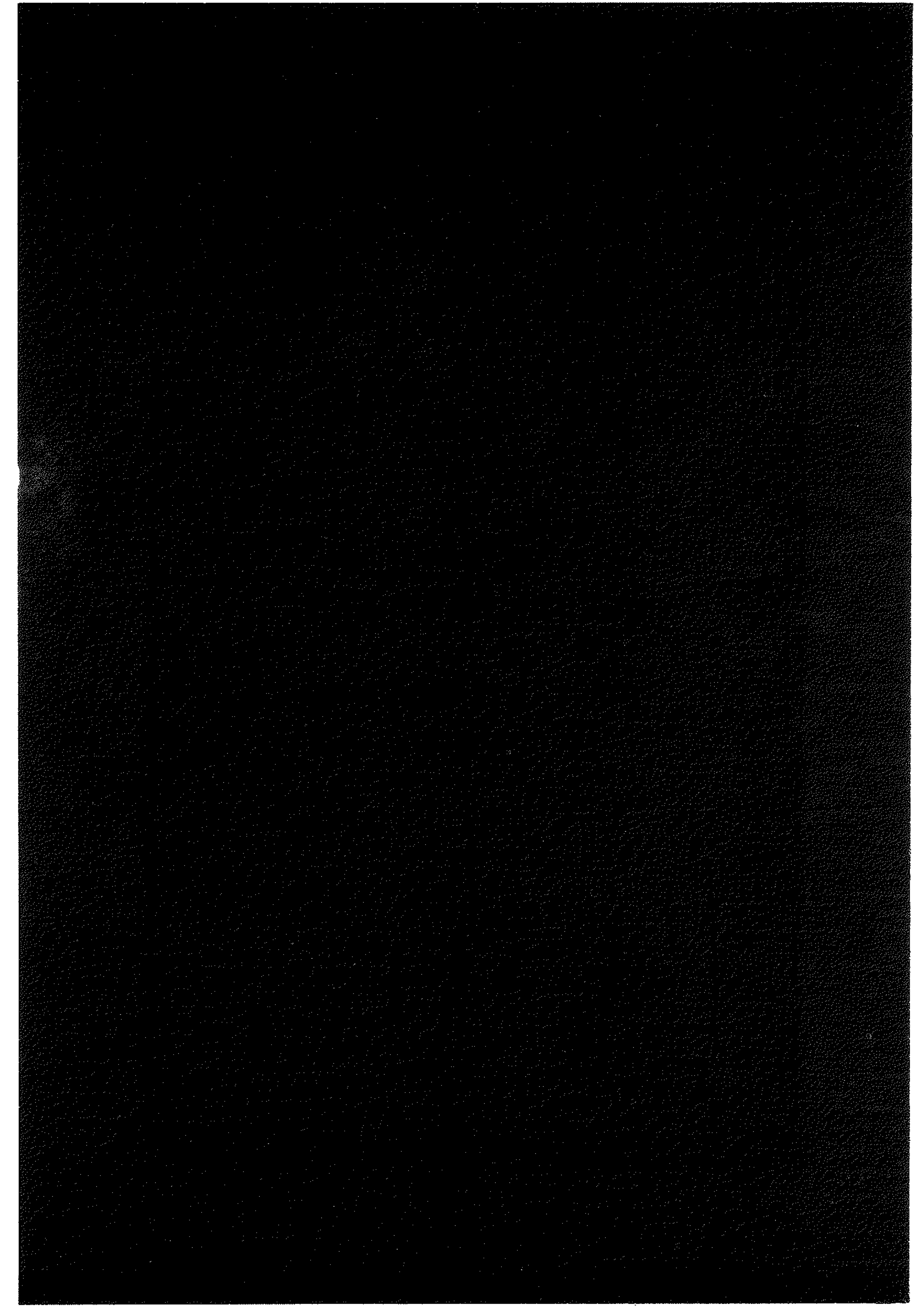
The following Departments could be a base for the suggested Institute:

a - Medicinal Chemistry and Pharmacognosy Department.
b- Department of cultivation of medicinal plants.
c - Department of Pharmacology.
d - Department of Pharmaceutical Technology and Industrial Pharmacy.
e - Department of Marketing.

ADVANTAGES OF HERBAL MEDICINES

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ADVANTAGES OF HERBAL MEDICINES *

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It is a happy occasion that today both Hakims and doctors are engaged in the research programme of indigenous drugs. The use of medicinal herbs for amelioration of human suffering dates back to pre-historic times. The old Egyptians, Greeks, Romans, Arabs, Chinese and Indians, all developed their own local materia medica, dedicating themselves in their own spheres. There were considerable variations in the spectrum of prevalent diseases as well as flora in different countries, so much so that a strong belief was grown up that where there is a particular disease, the remedy may also be found in the neighbourhood.

The use of crude drugs including plants is traditional in Unani and Ayurvedic systems of medicines which were based occasionally on the then existing experimental methodology and mostly, on practical experiences of ancient physicians. Even today these traditional systems of medicine are very much in practice in India and they are given equal status as Modern Medicine and are recognised by the Government of India.

Some of the herbal preparations are still being used in Modern Medicine such as extracts, tinctures, to a limited extent, but, purified alkaloids and glycosides are widely employed.

In comparison, herbal drugs in Islamic medicine are generally used as crude single or compound drug preparations in the form of decoction, pills, powders etc...

According to Modern Physician it is often difficult to determine

* Bulletin of Islamic Medicine, 2:588-592, 1982.

the pharmacological, therapeutic and toxic effects of an individual component, present in such Unani herbal preparations, because the extracts of even a single plant may contain different active chemical compounds with either synergistic or antagonistic actions. Their observations clearly suggest the necessity of isolating the individual chemical constituent of a plant extract and further separating main active ingredient existing in it, prior to experimental screening in animals and human beings.

But a Hakim feels that crude herbal preparations have been in use for centuries and have proved to be less harmful in spite of prolonged medication and the drug interactions are extremely rare when thorough diagnosis is made and drugs are used in proper formulation. The formulations are so made as to minimise the untoward effects and enhance synergism, thereby increasing the efficacy of the preparation as a whole. The idea was perhaps based on the logic of humoral concept and study of temperaments and allied factors in the patient, for example, the basic pathological changes in the constitution of the body has been identified by the Hakim as hot and damp, hot and dry, cold and damp and cold and dry etc..., according to predominance of abnormal humour and the treatment is directed to set right this abnormality. The concept of constitution of human being is well recognised by the modern physician including the genetic variations and drug therapy.

Most of the indigenous drugs were locally available for therapy as well as research and some which were not available, but necessary, were imported from abroad by Hakims. Herbal preparations were preserved by using honey, syrup, vinegar, etc. Some of these items are still being used by the modern pharmacist. In addition, many more chemical methods of preservations have been developed recently. Alcohol was mostly used as an antiseptic.

Prescriptions according to Hakim essentially consist of a solid preparation (pills, tabs.) or a semisolid one (majoon etc.) along with

an excipient such as decoction, infusion, etc. The latter may help in rapid absorption of the main drug or act as an adjuvent therapy influencing the pharmacokinetics and probably increasing the bio-availability.

Reliability is one of the important criteria for the use of medicine.

Certain drugs like calcinated iron, copper etc. require the aid of herbs and special processing techniques to prepare a final product for medicinal use. Their use in Islamic medicine can be correlated with modern concept of essential trace elements in the diet for maintenance of health.

Munzij and *Musshil*

These are special kind of medicines practised by a Hakim. They vary according to the defect of the humor (خلط ردی) which is responsible for the disease state. These are especially useful in chronic and resistant conditions. *Munzij* is decoction prepared out of special class of individual herbs, meant for administration for a specific period, which is to be followed by a *Musshil* (laxative) a compound drug preparation, to make the body free from the defective humor. Such preparations require scientific study to establish their validity in chronic inflammatory, degenerative, metabolic and malignant disorders.

Toxicity

Severe toxicity to vital organs such as liver, heart, kidney and damage to bone-marrow are rarely heard of, in Islamic medicine. Herbal medicines though less potent are less toxic also (ref) in spite of their prolonged medication. Hence, it is suggested that combination of modern drugs (which are comparatively more potent and more toxic) with herbal medicines is worth trying, to prevent or treat their toxicity, if there are no interactions. The work is in progress with some of the Indian manufactures with their indigenous drug preparations

and it proved to be successful to a considerable extent. The old herbal drugs need scientific screening in patients whose consitution does not permit more potent and more toxic modern drug therapy and in those where they failed, to produce favourable results.

No specific antidotes were available to the Hakim in olden days to treat poisoning, although several types of poisoning were said to have been treated by physicians. They treated poisoning with non specific antidote (*tiryak*), the value of which was conflicting (according to Maiminoides) but simultaneously demulcents and absorbants, were also used which were indirectly helpful in the elimination of poison from the body.

Diet and Nutrition

The Hakim believes in the treatment of a disease with both drugs and diet together (علاج بالدواء – علاج بالغذاء). Diet may be either restricted or special diet advised according to the ailment.

The condition of Hakim behind dietary control is to maintain nutrition and to increase the defence mechanism of the patient specially in chronic conditions. Several substances with nutritive value such as different fruit juices, vinegar, alcohol, honey, whey, barley-water and special proteinous preparations (ماء اللحم) are included as adjuvents, correctives, excipients.

In the light of modern science they would help the patient by providing with carbohydrates, fats, proteins, minerals and vitamins and maintain fluid and electrolyte balance especially in conditions where dehydration is present for e.g. gastrointestinal and other wasting diseases. Restrictions were made to minimise food-drug interactions and to aid drug action (this is to be investigated scientifically).

Value of fruits in health and diseases

Regular intake of citrus fruits such as sweetlimes, oranges etc., in the form of juice may be helpful in preventing diseases like

hypertension, obesity, hypercholestremia or occurrence of their complications.

Role of vitamin C in prevention of atherosclerosis has already been studied scientifically with favourable results (Dr. Constance Spittle of England refer British information service release (1974) by Dr. Roger Diwin).

According to Islamic Medicine easily digestible food item (like citrus fruit or juice) is better taken first.

Bed-ridden patient is given light diet.

The role of fruit juices and restricted diet or special diet in altering the blood chemistry and their use in therapeutics, need further study.

Diseases Discussed

Therapeutic usefulness of herbal preparations in chronic conditions such as rheumatic disorders, sinusitis, skin diseases, etc., has been amply experimented with satisfactory results. In addition acute conditions like infective hepatitis, a few types of skin allergy, urolithisis etc., are also treated successfully, the response being equal to or better than with modern medicine.

CONCLUSION

We are adopting many things from ancient medical literature gradually one after the other, of course with necessary modifications e.g. 1) massage, 2) sun bath, 3) diet etc., but with the advanced technology available to us now, we are made to think that we are better off than our forefathers. No doubt, there is an element of truth, but there is no harm in further exploiting ancient literature and benefitting ourselves by collaborating with Hakims well- versed with the subject. Joint effort in keen observations may help in understanding several unsolved problems.

Research work has not picked up the momentum required for indepth study of indigenous drugs mainly due to:

1) Lack of common forum for communication between a Hakim and a doctor, and
2) Absence of generalised awareness of the benefits of herbal medicines.

Modern medicine is enjoying a superior status because it is supported by advanced technology. If the same technology is made available for research in herbal medicine, it will also attain its rightful place in alleviation of sufferings of humanity.

Failure of modern drugs therapy in chronic diseases and their sequels is well known. If the herbal drug therapy is found successful in prevention of complications of any chronic disease it will be a very valuable achievement for humanity.

It is proposed that crude drug preparations which carry with them centuries long experience of Hakims about their utility and safety can be put directly on clinical trials under the supervision of both Hakims and doctors in various hospitals accompanied by Modern investigations and a list of promising drugs should be prepared for further study, including animal experimentation, and screening of active ingredients by chemical analysis. This can save time, men and money, spent on herbs of doubtful efficacy. If it is not desired on behalf of the doctors, who would prefer clinical trials preceded by pharmacological and toxicological studies as a routine, it is suggested that they can obtain available herbal preparations in the existing form from the standard manufacturers in India or elsewhere and further study for their physical, chemical and biological properties before using them on human beings.

Shortcomings of modern medicine in general are:

1) Drug toxicity
2) Drug refractoriness
3) Necessity of laboratory investigations
4) Drug resistance and interactions
5) Increased cost of medicines etc

In spite of the available several wonder drugs with their selective activity, the modern physician is sometimes confronted with the above mentioned difficulties. Hence, he is still in search of safe and ideal drugs.

Shortcomings of herbal medicines such as:

1) Difficulty of standardisation
2) Lack of selectivity
3) Slow onset of action
4) Lack of availability due to want of knowledge of pharmacognosy.

NOTE: Several old valuable recipes might have disappeared unnoticed.

The present day available information regarding fundamental and applied research on drug action is scattered and somewhat conflicting. The work done already in the past was again repeated by some scientists unknowingly and by others either to confirm or to condemn the past results. However, it is advisable to have a common platform to chalk out programme to collect relevant information and to conduct advanced research in collaboration with Hakims and Doctors and disseminate the information thus gathered to different institutions as and when required.

Even now a sizable population of the world lives in the rural areas of the countries like India, Africa, China, and Middle East. They feel that the native drug therapy is more beneficial for them. Hence, collaboration of Hakims as well as Doctors is more desirable to achieve the goal of World Health Organisation (i.e. betterment of humanity). This can only be achieved by emotional integrity, mutual frankness and team spirit.

LET EVERY BODY BE HAPPY
LET EVERY BODY BE HEALTHY
LET ALL SEE ONLY PLEASANT THINGS IN LIFE
NO ONE SHOULD EVER SUFFER

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INVENTORY OF MEDICINAL PLANTS USED IN THE TRADITIONAL ARABIC MEDICINE

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SPAIN

INVENTORY OF MEDICINAL PLANTS USED IN THE TRADITIONAL ARABIC MEDICINE*

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With this work we propose to make a catalogue of the medicinal plants which appear in Arabic texts of different authors, classifying the drugs according to their properties and medicinal uses; afterwards we will verify their survival in European pharmacopoeias.

There exist many writings on the subject of traditional Arabic drugs, however, to make a study which would verify the most employed drugs, it would be necessary to publish and translate all pharmacopoeias and treatises on materia medica preserved at the present time. Until now only a small part of these works have been published and translated, although the immense majority are at present in manuscripts, thus unedited.

This is a work which has been carried through by the Department of History of Pharmacy of Granada, and at the moment they are translating works such as: the *Minhāŷ al-dukkān* of kūhīn al-ᶜAttār; *Kitab al-Dukkan* of Ibn ᶜAbd l-Rab bi-hi[1]; *Glossary on the Mansuri of Razi* of Ibn al-Hassa[2]; Index of medicinal substances mentioned in *Kitab al-Kulliyyat* of Averooes[3], etc.

For our work we have used five writings: *al-Dustur al-bimaristani fi l-adwiya al-murakkaba* of Ibn Abi al-Bayan; *Kitab al-yamiᶜ fi l-asriba wa-l-ma ᶜayin* of Avenzoar; *Sarh asma' al-ᶜUqqar* of Maimonides; *Tuhfat al-ahbab and Kitab al-agdiya al-mufrada* of Ibn al-Baytar.

Al-Dustur al-bimaristani or Formulary of the Hospitals [4], is a

* Bulletin of Islamic Medicine, 1:263-268, 1981.

work of Ibn Abi l-Bayan, a Jewish physician born at Cairo in 1161 and died in 1240[5].

This treatise contains twelve chapters, and referring to its contents we can say that it is a very complete formulary, in which appear great number of recipes for many diseases. It is a practical formulary, exclusivley designed for general hospitals. The number of included diseases is two hundred and thirty, and the number of drugs and adjuvant products is six hundred and seven.

The writing is basically meant to cure diseases, by means of using remedies mostly original from the vegetable kingdom, although from the mineral and animal kingdoms, too.

It includes one hundred and seventy-five recipes, being most of them confected under the forms of syrups, electuaries, ointments, pills, powders, etc.

In the employment of the medicinal plants, in many occasions he has mentioned all its parts. He frequently has mentioned its root, and in other occasions, its seed, fruits, leaves, etc. Sometimes he also mentions its juice or its pulp.

The followed arrangement for the description of each compound is as follows: In the first place he indicates the usefulness and virtues of the medicine; afterwards he enumerates the several components and quantities to be used; and finally, the appropriate dose for each case and the way of administration.

Kitab al-yami^{c} fi l-asriba wa-l-ma^{c}ayin[6], a work which was written up by way of complement to the *Kitab al-Taysir*[7] of Avenzoar[8].

The *Kitab al-yami^{c}* is a theoretical-practical medical pharmacopoeia; it contains a total of two hundred and thirty different medicaments. Eleven of them proceed from the mineral Kingdom, five are of animal origin and the rest are vegetable materials.

The author arranges the different Simples which are going to form part of each Compound, according to the quantities to be used of each one of them. In the first place appear those simples of which there are

to be used three *ūqiyyas*, afterwards all of which there are to be used two of them, etc., always follwing a decreasing order.

We remark that one and the same drug can be used, employing its several parts - root, seed, fruit, leaves, etc. The confection of each compound, i.e. syrup, electuary, pills, etc., has been minutely described, because as per the author, the physician has to know perfectly the preparation of medicines, in order to be able to elaborate them personally, when necessary[9].

The medicinal forms employed by the author are the following ones: syrups, electuaries, pills, theriacas, plasters, pomades, ointments, etc.

Šarh asmā' al^c Uqqār or Explanation of the Names of Drugs[10], is a work of Maimonides, physician from Cordoba, born in 1135 and died at Cairo in 1204.

It is an alphabetically arranged glossary of synonyms of medicinal drugs. The purpose of the author when he wrote this book, was not to describe the simple remedies, nor to discuss its employment, but to give the synonyms. For this reason he excluded from his list the better-known drugs and of course, those which only had one name.

Just like in other works on synonyms, the four hundred and five items of Maimonides glossary of drugs, are of changeable length; some of them only include three lines, whereas others occupy fifteen. The author generally gives as title of the item, the best-known name of a drug and the synonyms in Arabic, old Greek, Syriac, Persian, Berber and Spanish.

Tuhfat al-ahbāb or Glossary of Moroccan materia medica[11], and anonymous work of unknown date. Referring to the contents of this work, it is an alphabetical glossary of synonyms of medicinal plants and it consists of four hundred and sixty-two items of unequal length. It offers the synonyms in Berber and Spanish. The followed order in the alphabet is the *Maghrebi*. Generally it is a synonymous vocabulary

probably extracted from a general treatise of medicine; most of the mentioned plants, according to Renaud, are still sold today in many Moroccan bazaars. He often quotes Dioscorides, but he does not mention the therapeutical usefulness of the drugs.

Kitab al-ŷāmiᶜ li-mufradāt al-adwiya wa-l-agdiya or Compendium of Medicine and simple foodstuffs[12],a work of Ibn al-Baytar, physician from Malaga, born in 1197 and died at Damascus in 1248.

It is the best-known work of the Arabic Pharmacology, it offers an enormous collection of extracts, in which Ibn al-Baytar described more than 260 sources, and only in some occasions he uses his own words.

His approach is generally based on the fact that he indicates the synonyms of the several drugs and that he rectifies mistakes of his predecessors. Sometimes, Ibn al-Baytar was called a non-original compiler, although this judgement is not completely justified. The *Kitab al-ŷamiᶜ li-mufradāt al adwiya* at least has been realised with excellent professional knowledge. Among the mentioned works, the one which occupies the first place is Dioscorides Materia medica; it seems that he entirely transmits this work, although with some variations, as Ibn al-Baytar mentions the drugs by alphabetical order.

The collation of these five works has lead us to select in a first approximation, fifty drugs of vegetable origin which concur in these consulted glossaries and which we will offer at the end of our work. Of these drugs we will mention the common name, the scientific and the Arabic name. Although the number of coincident plants is superior to the one we offer, we have had to limit us to a determined number of them, due to the extent of our work. This fact has permitted us to know all drugs used by the Arabs and to know which were the best known in the Orient, Spain and North-Africa.

A very interesting point to study is to verify the frequency of repetition of the drugs, in order to see which are the most used ones. Of these five consulted repertories, we only have been able to do it in two

of them, the *Kitab al-yami*ᶜ of Avenzoar and *al-Dustur al-bimaristani* of Ibn Abi l-Bayan, since the others are glossaries as we have been able to see when we discussed them.

Having verified this section, we have come to the conclusion that Occident as much as Orient nearly always coincide in the number of frequency of repetition of each drug.

We have checked the used form of the several parts of each plant which appeared in the studied works; although the study has been exhaustive for each one of them, we are obliged to offer some examples, only.

Fennel, used parts: seed, juice

Pomegranate, used parts: flower, juice, seed

Water-melon, used parts: seed, flower

Myrtle, used parts: flower, leaves

Violet, used parts: seed, flower

Cyperus, used parts: root, flower

Tamarisk, used parts: root, rind

Liquorice plant, used parts: stem, juice, root

Caper bush, used parts: root, rind

Citron, used parts: rind

Stoechas, used parts: flower

Wild chamomile, used parts: flower

Water nymph, used parts: flower, seed

Scarlet mallow, used parts: rind, seed

Rose, used parts : flower, seed

Lily, used parts: flower, seed

Roman laurel, used parts: seed, leaves

Clover dodder, used parts: seed

Finally we have checked the survival of these drugs in Spanish pharmacopoeia, such as "Pharmacopeia Matritensis"[13], Pharmacopoeia Hispana[14] and the "Farmacopea Espanola"[15], as reflected in the

outline we offer. We are also preparing the review of other European pharmacopoeias.

The work we offer here logically is an advance of our further investigation.

This study has been oriented according to the accepted basis at the 31 World Assembly of Health, held in May 1978, tendentious to make an inventory of medicinal plants used in the traditional Medicines. Likewise there exists a hope to cover in a second phase, the available scientific data about the efficiency of the medicinal plants used in the classical Arabic medicines and its derived products in the treatment of affections and concrete diseases.

Account of Selected Drugs And its Survival in European pharmacopoeias

Common Name	Scientific Name	Arabic Name	Ph. M.	Ph.H.	F.E
Pomegranate	Fruit of *Punica granatum* L	رمان		●	●
Saffron	*Crocus sativus.* L	زعفران	X	X	X
Cyperus	*Cyperus longus* L.	سعد		X	X
Aloe	*Aloe vera* L	صبر			X
Tamarisk	*Tamarix gallica* L.	طرفاء			X
Jujube	Fruit of *Zizyphus sativa* Gaer.	عنّاب			X
Agrimony	*Agrimonia eupatoria* L.	غافت	X	X	X
Venus's hair	*Adiantum capillus-veneris* L.	كزبرة البئر	X	X	X
Rose	*Rosaa gallica* L.	وردة		X	X
Fenugreek	*Trigonella foenum-graecum* L.	حلبة			X
Long pepper	*Piper longum* L.	دار فلفل	X		X
Common ginger	*Zingiber officinale* Rosc.	زنجبيل		X	X
Common cinnamon	*Cinnamomum zeylanicum* Nees.	سليخة		X	X
Spikenard	*Nardus stricta* L.	سنبل		X	X
Liquorice plant	*Glycyrrhiza glabra* L.	سوس		X	X
Lily	*Lilium candidum* L.	سوسن		X	X
Jasmine of poetry	*Jasminum officinale* L.	ياسمين		X	X
Common barley	*Hordeum vulgare* L.	شعير	X	X	X
Black cumin	*Nigella sativa* L.	شونيز	X		
Roman laurel	*Laurus nobilis* L.	غار		X	X
Pumkin	*Cucurbita pepo* L.	قرع		X	X
Cubeb pepper	*Piper cubeba* L.	كباب	X		X
Caper bush	*Capparis spinosa* L.	كبّر		X	X
Clover dodder	*Cuscuta epithymum* Murr.	كشوث			X
Plantain	*Plantago major* L.	لسان الحمل	X		X

Account of Selected Drugs And its Survival in European pharmacopoeias

Common Name	Scientific Name	Arabic Name	Ph. M.	Ph.H.	F.E
Sweet marjoram	*Origanum majorana* L.	مرزنجوش	X	X	X
Myrtle	*Myrtus communis* L.	آس		X	X
Sabin	*Juniperus sabina* L.	أبهل	X		X
Citron	*Citrus medica* L.	أترج		X	X
Prune	Fruit of *Prunus domestica* L.	إجّاص			X
Assarabacca	*Asarum europaeum* L.	أسارون			X
Stoechas	*Lavandula stoechas* L.	أسطوخدس	X	X	X
Euphorbium gum-plant	*Euphorbia officinarum* L.	أفريبون	X	X	X
Absinthium	*Artemisia absinthium* L.	أفستين	X	X	X
Opium	*Papaver somniferum* L.	أفيون	X	X	X
Melilot	*Melilotus officinalis* Lam.	إكليل الملك	X	X	X
Anise	*Pimpinella anisum* L.	أنيسون		X	X
Chebulic myrobalan	*Terminalia chebula* Retz.	إهليلج كابلي	X		
Hara nut tree	*Terminalia cetrina* Roxb.	إهليلج أصفر	X		
Belleric myrobalan	*Terminalia bellerica* Roxb.	إهليلج بليلج	X		
Wild chamomile	*Matricaria chamomilla* L.	بابونج	X	X	X
Venus's hair	*Adiantum capillus-veneris* L.	برشاوشان	X	X	X
Melon	*Cucumis melo* L.	بطيخ	X	X	X
Violet	*Viola adorata* L.	بنفسج		X	X
Tamarind	Fruit of *Tamarindus indica* L.	تمر هندي	X	X	X
Walnut	Fruit of *Juglans regia* L.	جوز			X
Wild mustard	*Sinapis arvensis* L.	خردل	X	X	X
Common cinnamon	*Cinnamomum zeylanicum* Nees	دار صيني		X	X
Fennel	*Foeniculum vulgare* Miller	رازيانج	X	X	X
Water nymph	*Nymphaea lotus* L.	نيولفر	X		X

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1. Actually this work is being subject to edition and translation from our side, according to the manuscripts of the Zahiriyya Library and the National Library of Algeria.

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3. Cf. C . PENA MUNOZ, *Indice de sustancias medicinales citades en el Kitab al-Kulliyyat de Averroes* in "*Estudios del Departamento de Historia de la Farmacia y Legislacion Farmaceutica*". V./5. Granada 1980.

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METHODS OF OBTAINING A NEW HERBAL DRUG BY USING DATA OF TRADITIONAL MEDICINE

Dr. Ovidiu Bojor

ROMANIA

METHODS OF OBTAINING A NEW HERBAL DRUG BY USING DATA OF TRADITIONAL MEDICINE*

Dr. Ovidiu Bojor
ROMANIA

There is no doubt that the herbal drugs are and will still be one of the three main resources of raw materials for obtaining medicines during the next millennium, i.e.:

- substances produced by the animal and human cells;
- substances produced by the vegetable cells;
- substances obtained by synthesis (either in imitation of some structures already existent or created by the human intellect).

As a secondary source minerals, especially trace elements, should not be overlooked.

Herbal drugs are used at present all over the world no matter how developed the countries are, only the extent and manner of use being different. If in the developed countries 30-50 per cent of the drugs contain natural active substances, in the developing countries more than 80% of their drugs are natural. There is also another difference: the modern medicine, European or classical, called "scientific", prefers pure active substances called also active principles whereas the traditional medicines prefer vegetal extracts, that is a total of active substances. This difference is also a consequence of the medical systems that are based on theoretical or philosophic arguments. We want to stress from the very beginning a fact we consider a very important one: a medical or a therapeutic system cannot be validated or cancelled by the investigating means of another system. If we try to do so, we make a fundamental mistake. In other words, if we do not

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know the theoretical basis of a medical system we cannot declare it efficient or not. We have stressed this because the researchers in the drug field in the industrialized countries try to demonstrate in a subjective, unilateral way and to characterize a drug or a traditional cure by means of investigating methods belonging to their system.

What we want to present in this paper is the methodology required to obtain a Herbal Drug on the basis of the traditional medicine data, by using modern techniques and by taking the basic principles of the concerned system into account. That is why we have selected those phases or stages as well as the fundamental conceptions which are common for all medical systems.

If I am wrong, please correct me; any suggestion in this respect must be directed to the success of this Congress which is to get assistance to the sick people.

1. Preparing or formulating a drug

We think that irrespective of the medical system, everybody agrees that a new drug should be more efficient, less harmful when given at normal therapeutical doses, but at the same time more active than former one.

The drug should also be reproducible and easy to be administered (to children, old people or to those with very severe diseases), less expensive and accessible thus to the greatest possible number of patients.

We hope that you will agree with our statement that in preparing or formulating a drug and especially in administering it, in combining drugs or other therapeutical techniques we must find upon the axiom: there are not diseases but sick people. We do not want by this to offend the drug manufacturers, the drug businessmen, but to call the physicians' attention to the fact that each person, each suffering individual should be considered in the first person singular, in all his or her functions, physiological and spiritual complexity.

The main stages which are the basis of obtaining a "Herbal Drug" are presented in the diagram annexed to my paper. I shall not present chronologically the stages, as they can be examined by all the participants in the volume containing the proceedings of this Congress. Allow me however to point out the "key" aspects, necessary for obtaining a "Herbal Drug" of a good quality.

The first stage is to formulate a new drug. Being a drug presented on a traditional basis, the team of specialists should know thoroughly the principles of the concerned medical system, be it Islamic, Arabian, Ayurvedic, Hellenistic, Chinese, Siddha or whatever it may be.

As sources of the information old or new treatise, manuscripts, data gathered from people using currently herbal drugs, or - what is more difficult from some families or healers, data transmitted and kept secretly from generation to generation as a family heritage should all be used.

All these data may be compared with those provided by classic medicine, but only as general information without exerting any negative influence.

From the point of view of scientific research, this first stage has the character of a basic research, implying creativity, philosophy, logic analysis, connections, inspiration.

2. Raw Material

The raw material necessary to obtain a herbal drug comes from the spontaneous flora or cultures at present, but in the future tissue or cell cultures obtained in laboratory are envisaged as well.

As far as the raw material - that is the medicinal plants - are concerned, I should like to call your attention to two important aspects:

1. The stock of the spontaneous flora is limited precisely to the species which are widely used. The merchants of medicinal plants wishing to obtain large profits after having bought them at very

low prices, would not give their attention to the protection of the country-side and would exploit to a maximum the existent stocks in different geographical areas. There are too few those thinking of protecting the species, too few those thinking of the future generations. The medicinal plants belong to an ecosystem and if the biological balance is impaired by an irrational exploitation, that will have disastrous repercussions on the other factors of the ecosystem.

In Romania, we have drawn up and developed a methodology of evaluating from a qualitative and quantitative standpoint the resources of medicinal plants during the last 30 years. The methodology - known as the "Economic mapping of the spontaneous medicinal flora" aimed at inventoring the available quantities of the raw material taking into account the Nature conservancey.

The spontaneous medicinal flora is exploited in a controlled manner at present, the collection is carried out in the same district(s) after a number of years, thus permitting the vegetation to be restored. Besides, it is compulsory to sow the field again with a specific species if the entire plants or their roots or rhizomes have been collected. I have already applied and recommended this system in some developing countries.

2.The cultures represent the second source of raw material. The cultures of medicinal plants represent important advantages over the spontaneous flora. They permit the cultures to be programmed, preferably in the neighbourhood of some industrial units which process and use a propagation material superior from a genetic and phytochemical point of view.

The character of the scientific research in this field is fundamental and applied.

We think that especially in the developing countries the cultivation of medicinal and aromatic plants represent a starting

line in assuring a source of raw materials. Irrespective of a small, medium or large scale industry, the sources of raw materials must be assured for a period of ten years at least.

3. Standardization of Raw Material

Another factor required to obtain a Herbal Drug is to assure a controlled supply of high quality raw material as constant as possible from a phytochemical standpoint.

The quality of a drug depends on the time of collection, on the drying and storage conditions, the duration of its activity (expiring date), purity, content of active constituents, etc. This kind of research is less theoretical and has a more practical character.

The quality conditions vary from one plant to another, from one country to another. They should be stipulated by teams of specialists keeping in mind the economic aspects as well.

Standardization of the raw material is essential in assuring a reproducible drug with constant properties.

4. Pharmaceutical Technology necessary to obtain a new Herbal Drug

Extracts, infusions and ointments are the traditional dosage forms of vegetal drugs. They all contain complexes of active principles and not pure substances.

A great number of vegetable drugs may be administered as such. To this group the plants containing alkaloids, cardiac glycosides, saponins, tannins, anthocyanins, vitamins, essential oils and other active constituents belong, which given in amounts of 1-4g assure the daily therapeutical requirements.

Our investigations as well as those of other teams of research workers have demonstrated that the above mentioned plants administered as such after powdering them, yield their active substances directly to the gastric juice, the gastro-intestinal resorption. being superior to an infusion or a docoction because of the wide

surface of contact. On the other hand a series of active substances are not deteriorated by heat or organic solvents.

For all drugs belonging to that group we recommend to manufacture tablets or coated tablets directly from the raw material. The whole technology consists in finely powdering the plants, weighing the components, adding some trace elements or other ingredients if necessary, homogenizing, granulating by "slugging", sterilizing in the cold and tableting. This simple methodology may replace the hydro-alcoholic or alcoholic extract in the countries where alcohol is prohibited for religious reasons (which one must take into account too).

This is but only one example of how a new Herbal Drug can be obtained in a small-scale industry requiring 10-50 people, simple equipment and technology and a minimum investment.

The control and investigations of this phase have a character of modifying and applied research.

If the assessment of pharmacodynamics differs from one medical system to another, there common items are however essential for any system: the toxicological study, the teratogenic effects and the bacteriological examination. The first two items imply a more complex methodology and should be carried out by a specialist (a micro-biologist). We insist on the microbiological control especially for Herbal Drugs obtained directly from the raw material which, owing to less hygienic conditions of collecting and preservation, may contain pathogen germs: bacteria, fungi, parasites.

Medicinal plants should be never allowed to be treated with herbicides, fungicides and insecticides, very harmful substances for man.

The few examples, I have given so far, show how a new Herbal drug can be obtained on the basis of traditional medicine data. What is new in this is only the technology and the dosage form. This aspect is perfectly illustrated by the words of Mr. R.H. Bannerman,

Programme Manager, Traditional Medicine, WHO: "We must therefore combine local genius with modern scientific technology".

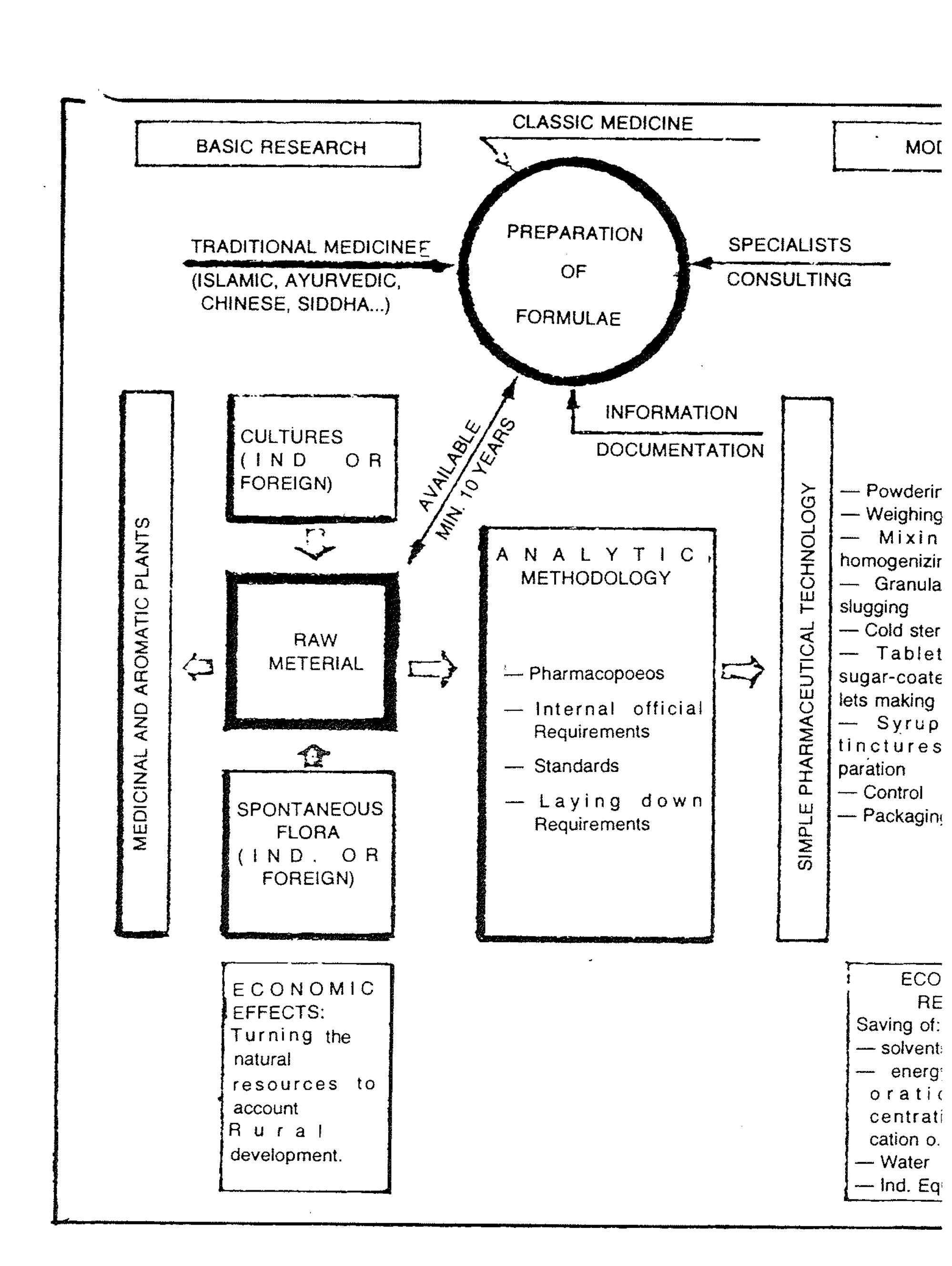
5. Organizational Aspects

In most countries there are "Commissions of Drugs" or similar bodies belonging to the Ministry of Health. In Romania, for instance, that Commission includes pharmacists and physicians in all medical specialities who discuss the proposals of a new drug, give an Opportunity Notice, send the first batch of the drug in clinics for clinical trials and finally give an Approval for Manufacture, which enables the manufacturer to start producing the new product. Finally, the new drug is registered and then sent to the market after the insert leaflet and the design on the package have been prepared and settled. Launching a new drug is not the final stage. Public should be informed of the new product, but the advertising and marketing activities should be decent, convincing and not trying to sell it at any price. We consider the drug is not a trade object, a business, but a help given to a suffering person.

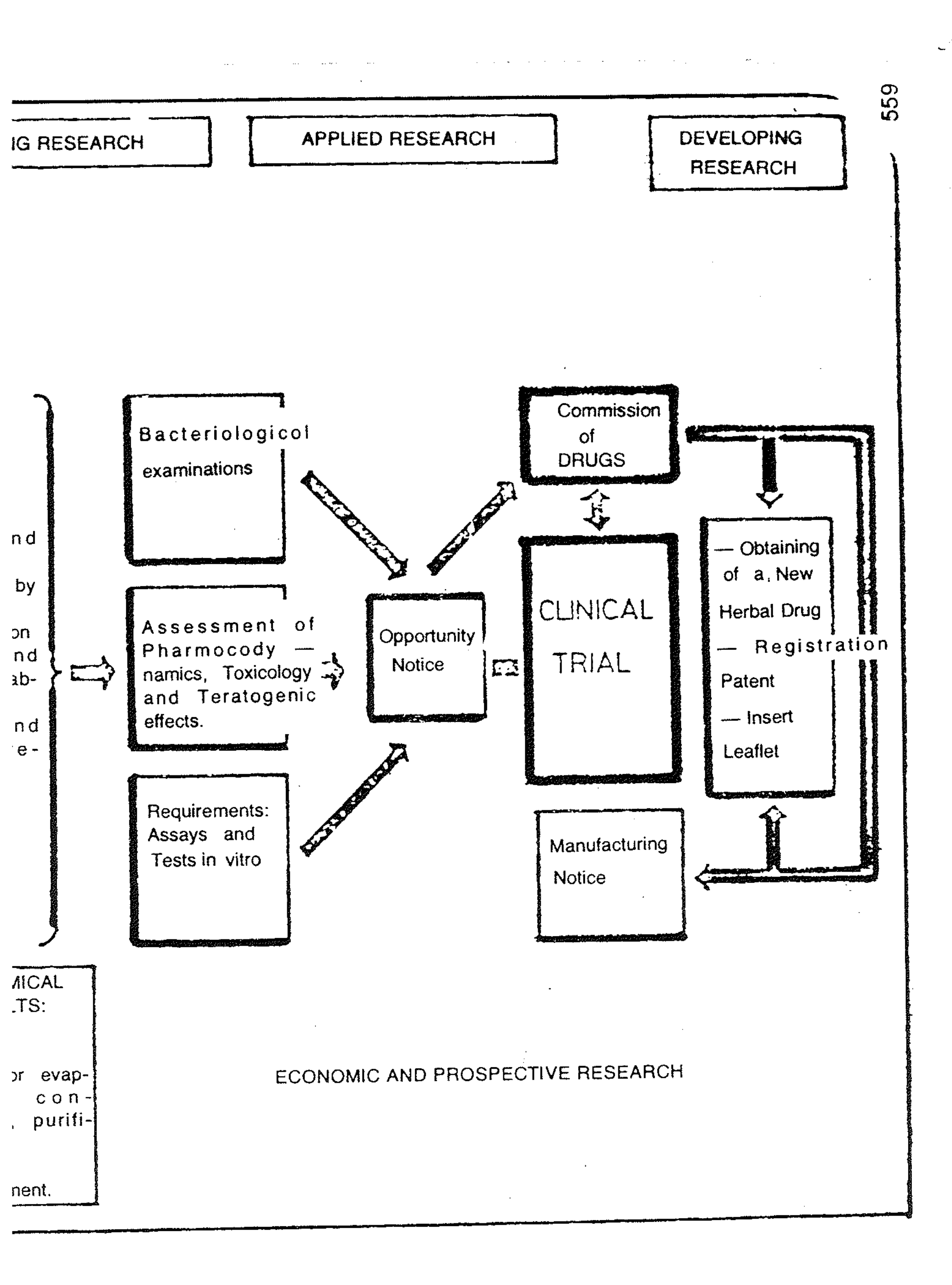
6. Economic Aspects

More than 14 years ago on the basis of the "Expert Group Meeting of Small-Scale Industries in Arab Countries of the Middle East" (Beyrouth, Nov. 1968), the recommendations on policies and programmes for the development of small-scale industries and the transition from artisan, handicraft activities to modern small-scale industries, regional and international co-operation was taken under consideration. But in the field of manufacturing medicinal plants and obtaining new Herbal Drugs no important progress has been made.

It was also generally recognized that the traditional sector in the Arab countries of the Near and Middle East is the dominant sector and accounts for an overwhelming majority of all manufacturing establishments.



BASIC RESEARCH
CLASSIC MEDICINE
MOD
PREPARATION
OF
FORMULAE
TRADITIONAL MEDICINEE
(ISLAMIC, AYURVEDIC,
CHINESE, SIDDHA...)
SPECIALISTS
CONSULTING
INFORMATION
DOCUMENTATION
AVAILABLE
MIN. 10 YEARS
MEDICINAL AND AROMATIC PLANTS
CULTURES
(IND OR
FOREIGN)
RAW
METERIAL
SPONTANEOUS
FLORA
(IND. OR
FOREIGN)
ANALYTIC
METHODOLOGY
— Pharmacopoeos
— Internal official Requirements
— Standards
— Laying down Requirements
SIMPLE PHARMACEUTICAL TECHNOLOGY
— Powderir
— Weighing
— Mixin
homogenizir
— Granula
slugging
— Cold ster
— Tablet
sugar-coate
lets making
— Syrup
tinctures
paration
— Control
— Packagin
ECONOMIC
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development.
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Requirements: Assays and Tests in vitro
Opportunity Notice
Commission of DRUGS
CLINICAL TRIAL
— Obtaining of a, New Herbal Drug
— Registration Patent
— Insert Leaflet
Manufacturing Notice
MICAL
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nent.
ECONOMIC AND PROSPECTIVE RESEARCH

In developing countries the small-scale industry sector coincides very largely with the group of establishments employing more than 5 and fewer than 50 persons per establishment. The small-scale industry should be defined to include those industries using modern technology but in which employment and investment in fixed capital are modest. It also shows that small-scale industry is almost exclusively a private enterprise activity in most of the developing countries. These general aspects are also applied partly to obtain new drugs from plants on the basis of data provided by the traditional medicine.

Bringing now my speech to a conclusion, I want to emphasize that when we prepare a new drug on the basis of the millenary experience of an ethnical or social group or of a medical system, I think that such a drug should be easily accessible to a great number of individuals.

In my opinion the drug as well as the medical assistance must not have frontiers or become a monopoly or object of unjustified incomes. The drug should not be a business. If I could impose my conditions, I would forbid the drugs to be licensed. The drug and all that science has attained so far in this field must be in my opinion the common wealth of all the mankind so much the better as more than 75% of the world population has still a poor medical assistance not very different from what it was thousands of years ago.

I also consider that the more developed nations, the international organizations and bodies should endeavour to promote the traditional medicine on a new scientific, sincere and unbiased basis. Healing physical or psychological suffering, liquidating malnutrition and the extreme poverty of people must be considered as charities.

All the countries, irrespective of their size, power or degree of development have an equal right to life, to freedom, to health. When all these desiderata become true the "Health for all by the year 2000" will no more be a simple noble ideal but pure reality.

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THE ACADEMIC AND SCIENTIFIC NATURE AND VALUE OF ISLAMIC MEDICINE (TIBB-I-ISLAMI)

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PAKISTAN

THE ACADEMIC AND SCIENTIFIC NATURE AND VALUE OF ISLAMIC MEDICINE (TIBB-I-ISLAMI)*

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PAKISTAN

The era of which Islamic medicine is the product, is no doubt ancient, but it was nevertheless an era of maturity of intellect, discretion and understanding. Man in that era had attained such heights of intellect and thought as to fully and perfectly conceive and grasp the universal truths. It was in this era that the Greek philosophers came to acquire universal recognition of their philosophical theories and logical inferences. Aristotle, Galen, Socrates and Hippocrates, all received in this period acknowledgement of their philosophical views, more than ever before. It was the very era that witnessed the auspicious birth of the great prophet ﷺ of Islam. The process of the progress of man after passing through various phases had reached such heights as to be able to absorb and reflect effectively the lights of Islam. It is for this reason that every branch of life in that era is characterised by an upsurge of high principles, lofty ideals and the emergence of a galaxy of personalities of eminence and accomplishment. More importantly, learning in that era was learning in the true sense, its aim being the search for truth and discovery of the secrets of nature. Learning had not been polluted by any motivation for acquisition of commercial or monetary gains. The advent of Islam led to added impetus to the human mind and enabled it to shape a new world so as to continue and accelerate the process of progress. A few centuries after the advent of Islam, in addition to non-Muslims, a great number of eminent philosophers and thinkers brought up in the tradition of Islam appeared who demarcated new

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paths of thought and action and presented theoretical and practical plans for transforming human life. I hope you would not attribute it to exaggeration when I say that what distinguishes the old from the modern world are the same intellectual and theoretical concepts of the Islamic period which later gave birth to scientific experimentations and industrial achievements which are, in fact, the line of demarcation between the old and the modern world. Had the Islamic era not given birth to the great thinkers and philosophers and had Muslims not laid the foundation of experimentation and observation, who can say the modern world would have taken its present shape and the West would be parading with pride its industrial achievements and scientific inventions. The pages of history do support the fact that Muslims not only made contributions to ideas and thoughts but also imparted training in experimentation and observation. These contributions and training, after passing through some further stages of progress, formed the basis of the Renaissance and the industrial growth of the West. What is under consideration here is not the level of achievement in the field of industry and technology in that era but the people who were the initiators, guides and pioneers in the field of learning, research, theoretical and conceptual developments and scientific experimentations and observations. History provides an irrefutable evidence of the fact that those who occupied the place of guides and leaders in this field were persons whose minds had been trained under the light of Islam. You may call them the beginners, but remember these beginners are also the pioneers and forerunners who showed the later generations the path of progress. By no rule of morality can they be denied the place of honour and esteem they deserve. The westernized minds may admire the West, but history proclaims the fact that verification of the universal truths of philosophy by the inductive process is one of the great achievements of the Muslim philosophers. This important fact of history is highlighted by the poet of the East, Allama Iqbal in the following words:

دانه آن صحرا نشینان کاشتند
حاصلش افرنگیان برداشتند

(The seed was sown by the desert dwellers but the produce was lifted or taken away by men of the West)

The fact to which I wish to draw your attention is that the Greek mind, despite all its greatness, could not travel beyond its logical inferences. When the Muslims took over Greek Medicine, they found it rich with logical inferences but devoid totally of experimentation and observation. The Muslim physicians soon realized this shortcoming in Greek Medicine and started to test the philosophical theories and logical inferences by putting them to experimentation also. They, thus, laid the foundation of a new medical science which on the one side was supported by logical inferences and absolute priniciples of philosophy and on the other the philosophical absolutes and hypotheses underwent scrutiny and verification by the inductive process. It is this new science of medicine introduced by the Muslims which we call Tibb-i-Islami and the nature and value of which is now the subject matter of our present discussion.

When science made further strides and entered the age of microscopic and chemical analysis, this traditional system of medicine was called empirical, although it was not empirical but was in the true sense a rational system. There was no aspect of this system which was not founded on science, reason and experimentation and where "why" and "whats" had not been or could not be effectively answered by cogent reasoning. Before, however, I take up the subject of "empirical", it would be appropriate if we keep the definition of that term before us so that we may consider whether it would be proper to call this traditional system of medicine "empirical". Empirical has been defined in Webster's Dictionary in the following words:

"Relying or based solely on experiment and observation"

Similarly, the Medical Dictionary by Dr. W.A. Newman Dorland defines the term empirical as "based on experience". These definitions show that by empirical it is meant that system of treatment which is based only on experiment and which does not have at its back any logic, reasoning or philosophy, nor is it regulated by any comprehensive principle or rule of universal applicability. This is the definition of empirical which really applies to quackery or non-scientific system of treatment. The Islamic medicine which is, in true sense, a scientific system of treatment and at the back of which, at every step from the beginning to the end, are logical inferences and verifiable truths and hypotheses, was given this appellation by the Western commercial pharmaceutical concerns out of sheer prejudice. Those who are aware of Western attitude know the fact only too well that Western attitude is not only mercantile but also artful towards the Asians generally and the Muslims particularly. In order to propagate the Western medicine or in other words to develop the trade of Western medicine, it was felt necessary to condemn and injure the otherwise useful, popular and harmless system of treatment of the East. It was for this commercial imperative that Islamic Medicine was accused of being empirical and as such deserving of condemnation. What is more regrettable is that our own medical practitioners who begin their professional career after acquiring modern science of medicine and assume the title of modern doctors, betray deep influence of the West and have, in the words of Lord Macaulay, a deep imprint of the Western mind. The result is that these modern doctors of our country, too, lend support to the commercial pharmaceutical concerns of the West and ignore and disdain to examine, try and understand the herbal drugs of Islamic medicine. This has led to two-fold dangerous consequences. The first being that the valuable asset of traditional medicine which our forerunners had collected after efforts of centuries, could not advance any further. That is, no addition could be made to the herbal drugs. The other serious consequences was that

this art gradually went out of the orbit of men of science and became monopolised by a class of persons who were conversant neither with modern nor classical medicine. It is this class which holds sway in this field so far. This is thus the period of stagnation and backwardness of Islamic medicine, the signs of the end of which are now appearing in some Eastern and Western countries, and it may be expected that by the end of this century some traces of its revival will perhaps become visible. Besides the compound drugs, the collection of herbal drugs which the Muslim physicians had left by the middle of the seventeeth century, numbers more or less four hundred. This is rather a small number, but my object is not to present the data of such drugs but to explain that the nature of these drugs of Islamic medicine, irrespective of what they are and what their number be, is scientific and not empirical. The drugs are truly scientific and stand fully the test of modern science. They can be called empirical only if in the determination of their potency, characteristics or their indicated use, no reliance had been placed on any science, logic or philosophy, but on mere experience and use. It is true that microscope had not yet been invented in that age, but rational sciences did exist and the capabilities of intellectual insight and understanding were at a high stage of development. Personalities were on the scene like Ibne Haitham, the father of Optics, who in his book (كتاب المناظر والمرايا) had made detailed study of reflection and refraction of light and thus paved the way for the invention of microscope, telescope and other optical instruments. So was present جابر بن حيان called by the Western historians "the father of chemistry" who by inventing various kinds of acids, gases and chemical instruments had laid the foundation of modern chemistry and science. It can be easily understood that the era which had produced towering personalities of universal and everlasting fame such as:

ابن الهيثم - جابر بن حيان - حنين بن إسحاق - ثابت بن قرة - علي بن ربن الطبري - أبو بكر محمد زكريا الرازي - ابن البيطار - البيروني - الكندي - أبو القاسم الزهراوي - الخيام - ابن رشد وابن سينا.

cannot be dubbed simply as an era of quackery and empiricism. It can also be easily understood that those who had occupied the place of inventors, discoverers and pioneers in the world of learning and science, could not tolerate in their time an unscientific and unstudied system of treatment. It is a misfortune resulting mainly from undue influence of the West that the people generally tend to identify discovery, investigation and research the result only of microscopic and chemical analysis, although microscope only helps observation while chemicals act on matter. The field of potency (قواي) and characteristics (كيفيات) is outside the scope of microscopic and chemical analysis. This is the reason why while laboratory tests deal with the constituent ingredients (أجزاء تركيبي) of matter, they are silent as regards potency and characteristics, though in medical science the knowledge of the potency and characteristics of drugs is more necessary than that of their constituent ingredients. It was for this reason that the early physicians made use of rational sciences also and devised logical rules for ascertaining the potency and characteristics of drugs. For example, علي بن سهل ربن الطبري the first author physician of the ninth century, which is the early period, sets apart a whole chapter in his famous book (فردوس الحكمة) for ascertainment of potency of drugs and lays down logical rules for the purpose. He writes:

هذا الباب في الدلائل على قوى الأشياء من قبل ألوانها وطعومها وسائر أعراضها.

(This chapter deals with rules with the help of which the potency of things can be ascertained from their colour, taste and other

characteristics.) He ascertained the potency of drugs by the rules so devised by him and then proceeded to test the properties of each drug by practical experiment. At one point he, therefore, writes:

ولكل شيء قوة لا يُعرف علتها ولا يدرك غورها إلا بالتجارب.

(A potency is hidden in every thing which cannot be ascertained without experiment). By these examples, I want to explain that even a physician of the early period, like علي بن سهل بن الطبري considered it necessary to put every thing through the process of experiment and only after he got confirmation of his logical inferences from the experiment he laid down a rule concerning the drug. This is the same inductive method of investigation of modern science which the Islamic physicians had adopted in the very early period and which is even now the hallmark of Western scientific system of research. In fact it will not be out of place to say that science itself is the very name of induction which had been introduced by none other than Muslim physicians.

Here I would seek your permission to present the definition of science from which you may assess how near was the system of research in Islamic medicine to the modern methods of research, even in the absence of microscope and chemical analysis. Science is defined in the following words:

> "A branch of study which is concerned with observation and classification of facts, especially with establishment (and, strictly, the quantitative formulation) of verifiable general laws, chiefly by induction and hypothesis".

This definition of science brings out the fact that induction and hypothesis are the methods of science for acquiring the knowledge of reality. The question arises as to where from to obtain and formulate the hypothesis for starting the scientific process. This is the first stage of scientific method of research where the need to seek help from rational sciences (logic and philosophy) is felt. This is to say that the

hypothesis is prepared with the help of logic and philosophy. Logic prevents the mind from falling into error in deriving inferences. In other words, the premises are so prepared that the mind is saved from error in deliberation. Thus take shape the universal principles موجبة كلية or سالبة كلية which are entirely the product of rational sciences and which we in the language of science call "hypothesis". In other words, science is dependent on the philosophical principles for its experimentations. That is why philosophy is called the mother of all sciences. Thus when a universal principle or hypothesis is ready, its verification is done by the method of induction and if a positive result ensues, the same is called a formula in the terminology of science.

I have just explained the scientific system of research. This very system of research is also practised in Tibb-i-Islami. In Tibb-i-Islami, too, hypothesis is prepared which is then tested and verified by the inductive process.The test may be of observation with naked eye or with the help of microscope but induction and hypothesis are present in both.

As for as hypothesis is concerned, it occupies an equal position both in Islamic medicine and in the modern medical science. Both shape their hypothesis with the help of philosophy. The framing of hypothesis is the first step in Islamic research and in this first stage the methods of research in both the Islamic and the modern systems are similar. The basis for this similarity is that in the first stage both require the help of rational sciences (logic and philosophy). After the hypothesis is worked out, the second stage, i.e. induction begins. It is here that the two systems of research, old and modern, differ from each other. In the old system, the process of induction was completed in the light of rational sciences by observation, with naked eye, of the patient while in the modern system of research, the process of induction is completed through microscopic inspection. There are definitely numerous advantages of the microscope. The constituent ingredients of matter can no doubt be understood with a microscope

better than by the naked eye. But in the science of treatment, the need to know the potency, the characteristics, the properties and the effects of matter is more important than to know its constituent ingredients. The science of medical treatment is concerned with the efficacy and properties of the matter and not with its constituent ingredients, though in the world of mechanization the constituent ingredients have their importance. The aim of science of medical treatment is not to re-struct the human body but to purge it of the cause of sickness. Therefore, kindly bear in mind that in the science of Tibb, the determination of property, potency and the characteristics of matter are important rather than its constituent ingredients. This object can be better achieved by usual induction under the guidance of rational sciences. That is, after the drug is administered to a patient its potency, character, effects and properties can be better understood by inspection of the patient on the sick bed. For this purpose visual observation and visual experiment, behind which is a mind trained in rational sciences, will be better. Kindly keep in mind that as the inductive process in Islamic medicine is guided by logic and philosophy, its great advantage is that even those properties of matter can be considered in Islamic medicine which are invisible or out of the microscopic scope. Of these invisible properties are their potency and characteristics. The Islamic medicine therefore determines the temper of each drug on the basis of its characteristics, whereas the modern medical science, since it relies solely on microscopic and chemical analysis which is restricted only to the visibles is bereft of the concept of temper of the drugs.

Another disadvantage of the excessive use of optical instruments in modern medical science is the decline of the mental and deliberative faculties in a majority of modern physicians who tend to rely more and more on mechanical and laboratory tests. This extraordinary dependence has also led to the deprivation, in the modern physicians, of the healing insight which is the distinctive quality of a physician. On the other hand, as

the entire asset of traditional medicine is rational sciences and visual observations and inspections, the traditional physicians are fully possessed of such healing insight and understanding.

What more can be said in support of the usefulness of Islamic medicine and its scientific nature than the fact that the modern science whenever it carried out research on herbal drugs of the old, it has only confirmed and verified, and not contradicted or falsified, the effects, characteristics and the indications for use of those drugs which are already determined by the classical physicians. By now, research on modern scientific lines has been carried out on as many as 200 old herbal drugs which had been widely used and found beneficial in Islamic medicine and this only brings out into limelight the fact that the old and the modern researchers have the same opinion in respect of the usefulness of the old traditional drugs. The difference, if any, is only of the method of processing and research, the old method being visual and experimental while the modern is based on microscopic and chemical analysis. The difference in the two methods has resulted in variation in their terminology but has not led to any conflict. Both reflect and interpret the same truth. I present here, for the sake of example, the effects and properties of some drugs as given under Islamic medicine and the result of modern microscopic and chemical research on same drugs whereby you can assess how close are both to each other in the matter of meaning and intent and how modern science has only affirmed and confirmed the usefulness of the old traditional medicines.

Myrtle berry (حب الآس): A well known and widely used drug in Islamic medicine. The old physicians had determined its temper as cold and dry and had declared it مسكن أمعاء and قابض وحابس الدم. Modern research and chemical analysis has discovered citric acid, salicylic acid, tannin, resin and some fatty constituents. These properties make *Myrtus communis* Linn. sedative, constipating and retarder of bood. All these properties support the effects and properties of this drug as given in Tibb-i-Islami.

Walnut (الجوز) : According to old research, its temper is hot and dry and it helps to tone up nerves, brain and memory. Modern research and chemical analysis has discovered Vitamins A, B and C in ample quantity in its kernal. In addition important ingredients such as iron, copper, phosphorus, magnesium, arsenic and sulphur have also been found. These ingredients support the effects and properties as determined by Islamic medicine. A thing possessed of so many vitamins and minerals is certainly good for the nerves and the brain.

I may also advert to the startling discovery that the more the scope of research and investigation widens and the more science progresses, the usefulness and efficacy of the old herbal drugs becomes clearer. Till yester years the Western countries had ridiculed the old herbal drugs but as their efficacy is becoming clearer with the advancement of science, the Western researchers themselves are now coming out with information regarding one or the other herbal drug in Western medical journals. Recently, the Saudi Daily "Al-Jazira" by reference to the Western medical journal "LANCET" in its edition of 20th October 1985, has made an important disclosure about the usefulness of onion. The daily says:

البصل أفضل علاج لمرض السكر.

أكدت أحدث دراسة علمية أن البصل أفضل علاج لمرض السكر حيث أنه يخفض نسبة السكر في الدم ويقلل نسبة الأنسولين التي يتعاطاها المريض من عشرين إلى أربعين وحدة يومياً.

(Onion is the most efficacious treatment for a diabetic patient. The latest scientific investigation has proved that onion is the best treatment for diabetes. It helps to reduce the ratio of sugar in blood and thus enables patients whose daily intake of insulin is 20 to 40 to reduce such intake).

A move towards herbal medicines has started in nearly every part of the world. I am now presenting before you the opinion of the

Egyptian Doctor Faiza who is professor of Pharmacy in the National Research Centre, Cairo and who is a recognized authority in pharmacology, which can enable you to assess the importance of herbal drugs. The Doctor in the well known Arabic Journal "Al-Mashriq-ul-Ausat" which is published simultaneously from London and Jedda, has opined that:

ومع التقدم العلمي اتجه الإنسان إلى الأدوية الكيماوية وأصبحت نظرته إلى النباتات والأعشاب على أنها أساليب متخلفة إلا أنه مع ازدياد التقدم العلمي ثبت خطأ هذه النظرة وعاد الإنسان إلى الطبيعة أعني إلى الأدوية الأعشابية.

(with the advancement of science the attention of man turned to chemical drugs which gave rise to the view that treatment through herbal drugs was out of date and wasteful. But further advancement of science has shown that this notion was erroneous. Now man is reverting to nature, that is, he is returning to herbal drugs).

Further, in the same article, the said Doctor observes that in the Western coutries attention has turned to herbal drugs on account of the fact that it has been scientifically established that some modern drugs are cancer causing. He says:

وكان هذا الاتجاه رد فعل لاكتشاف الآثار الجانبية للأدوية الكيماوية خاصة بعد أن ثبت بشكل مؤكد أن هناك بعض الأدوية الجديدة تسبب الإصابة بالأورام السرطانية.

(Attention to herbal drugs is in fact the reaction of the discovery that chemical drugs are responsible for side effect. Attention to herbal drugs was particularly given when it was established on scientific grounds that some modern drugs are responsible for causing cancer).

Of the many drugs which are becoming responsible for causing cancer, I may draw your attention to one of which the trade name was DES and generic name DIETHYLSTILBESTROL. This drug was

administered during pregnancy to prevent bleeding. Since bleeding may lead to abortion, this drug was used to save women from the risk of abortion, but whether it was efffective in preventing abortion or not, its use caused cancer among the women expecting to be mothers. The American journal "Readers Digest" in its September 1985 issue has given a detailed study of this drug and has called it "time bomb". I am sure the same might have come to your notice but I may be permitted to reproduce some extracts from the same:

"Over the years it has gradually developed that DES was a "time bomb" drug, exploding years after ingestion in the lives of the children, of women who took it".

A sizable number of women fell victim to cancer because of this drug. The reports of research on this drug which appeared in many European countries showed that a number of women used this drug became victim of cancer. According to the report of Readers Digest:

"There have been 25 cases connected with DES in the Netherlands, two of them fatal. In France about 15 cases have been recorded. In Australia at least a dozen cases, of DES - linked clear cell of adeno-carcinoma have been reported".

It is strange that when a new drug appears in the market, it is hailed by the modern doctors who are full of praise for it but the same drug which had been considered so praiseworthy is, after a few years, discarded and condemned. Not only are the properties and effects of such drugs announced earlier negated and rejected they are found to have various harmful and dangerous effects. In 1940 the drug DES, of which I have just now made a mention and which has been found to be cancer causing, came into the market. It was hailed by the modern physicians and according to the Readers Digest:

"Almost overnight this synthetic drug was marketed in the United States where it was hailed as a wonder drug and prescribed for millions of women".

According to the Readers Digest, the drug had been invented in 1940 and had been called a wonder drug and had been held to be most effective for preventing abortion. In the early decade of 1950, the researchers reported that the drug was not effective in preventing abortion and, in 1960 it was held to be causing cancer. In 1970 it was reported that the use of the drug had made a number of women in Europe, America and Australia victims of cancer and now in the present decade the drug has been declared dangerous to such an extent that its use can cause cancer not only in the women who take it but also, years later, in their children. It is now called "time bomb drug". It began as a "wonder" drug but has ended as a "time bomb drug". This is unfortunately, the end which the synthetic and chemical drugs come to, and this is the result of our aversion to an escape from nature.

It needs, therefore, to be considered as to what opinion can we have about the system of treatment and drugs about which it is first claimed that they are scienific but then through scientific research it is later discovered that they are harmful and deadly. It is on account of these scientific drugs that the Western countries are now worried about the disastrous effects of their own products.

On the contrary, the drugs of the Islamic medicine even without the aid of microscopic research, are close to nature and on account of this closeness are free from harm and danger. Moreover, their benefits which stand established from times immemorial are now attracting the Western countries. The use of herbal drugs is currently on the increase in most of the developed countries. I may again quote the Egyptian Doctor Faiza to show the importance now assumed by herbal drugs in the developed Western countries:

وقد بدأت كل دول العالم المتقدمة في إجراء البحوث على الأعشاب الطبية واستخراج أدوية منها لعلاج مختلف الأمراض، ورغم أن انجلترا من الدول المحتفظة جداً في السماح بتداول أي دواء جديد في الأسواق وتضع قيوداً صارمة وإجراءات دقيقة للتصريح بصناعة دواء

جديد وطرحه للاستخدام ورغم كل ذلك فلدى بريطانيا الآن دستور طبي كبير للأدوية من أصل نباتي.

(Many Governments in the developed countries are now turning their attention to herbal drugs and are obtaining medicines for various ailments from herbal drugs. Even in England, which is one of the countries having a conservative and cautious approach, where the use of every new drug is not easily permitted and where there are strict restrictions allowing the use only of such drugs which are permitted only after thorough investigation, a comprehensive organization has been set up for working specially on herbal drugs).

Apart from the scientific nature of Islamic medicine, there is another aspect of its practical and general efficacy which requires consideration. That aspect is the rural character of population of our countries especially the Afro-Asian countries. According to the statistics, 70 to 80 per cent of our population lives in rural areas. From this aspect also you can easily consider how beneficial and unavoidable is the recourse to the Islamic system for the rural population.

For a physician the first stage of treatment is diagnosis of the disease. The physician in the Islamic system is to a great extent self-sufficient in the matter of diagnosis. This is because in acquiring the art of diagnosis he is guided by his training and the rational sciences, in such a way that he is not dependent upon laboratory tests but makes a careful observation of the condition of the patient and the symptoms of the ailment, tries to find a logical connection between the causes and the symptoms of the ailment and thus fulfils the important requirements of diagnosis. For this purpose Islamic system has a regular branch called Science of the General Principles, with the help of which the physician develops a medical insight which helps him to become self-sufficient in the matter of diagnosis and a good deal independent of the need of laboratory tests. You can easily appreciate

that in the countryside where means of communication are scarce, where even ordinary dispensaries are non-existent and where radiologists and pathologists are not available, the Western system, which cannot move a step without well-equipped laboratories, cannot work. I, however, leave it to you to compare the two systems and decide as to which of the two systems, the Islamic or the Western, is more suitable, in the national interest, for the rural population of the country.

After diagnosis when we consider the question of nature of treatment (نفس علاج) and nature of medicines (نفس أدوية), the value of Islamic system becomes all the more evident and obvious. Almost 98 or 99 per cent of drugs in this system are herbal which are found mostly in the countryside. This system of treatment, therefore, tends towards self sufficiency in the matter of supply of drugs. There is now an urgent need for reviewing our herbal drugs and subjecting them to research by our scientists so that we not only provide better medicines to our people but also try to become self-sufficient in the matter of their supply.

QUALITY CONTROL OF ISLAMIC MEDICINE

Dr. Inamul Haq
PAKISTAN

QUALITY CONTROL OF ISLAMIC MEDICINE*

Dr. Inamul Haq
PAKISTAN

Islamic medicine is an ancient form of health care practised long before the appearance of scientific medicine. It is a part of culture of many people and has a very rich heritage. The materia medica of Islamic era was very comprehensive comprising a variety of drugs to combat the various diseases prevalent in those days.

Though the drugs have been used throughout the ages for the treatment of diseases, it was only during the Islamic era that the concept of "Quality" was born for the first time. Besides regular inspections of the apothecary shops by the government appointed inspectors, the pharmacists were made responsible to procure, to keep or stock and to dispense sound, genuine and fresh drugs with the main object of providing standard drugs to the consumers. Similarly the first Pharmacopoeia was produced during the Islamic era. Evidently the Islamic medicine duly recognized the importance of using genuine and quality drugs in order to have their full therapeutic effect. The Islamic medicine however met a serious set back under the Western influence because the natural sciences were ignored and stress was laid only on chemistry. With the advent of synthetic drugs during the 19th century, the Islamic medicine went into the background. During the last two decades however there has been a great revival of interest in the Islamic medicine and scientists all over the world are busy in a scientific inquiry into these medicines considering their great therapeutic potential. The Journal of Phytochemistry alone now

* Bulletin of Islamic Mdicine, 4:390 - 392, 1986.

publishes about 3,000 pages annually crammed with reports on natural drugs, all awaiting to be tested for biological activity. Whereas the Islamic medicine is attracting the attention of modern scientists, its quality aspect is being completely ignored and yet Quality Control and standardization of Islamic medicine is imperative to secure uniformity and therapeutic efficacy.

Lately, however, there is growing concern about the quality of these drugs apart from their efficacy and safety. What is Quality? Quality of a drug in broad term means that the drug should conform to the established standards and specifications as regard purity, strength and other characteristics during the period of its intended use. So the first and the foremost requirement for standardization of medicines of Tibb is the preparation of Quality Control monographs for each drug laying down their standards and specifications along with methodology for testing.

WHO had published some work on standardization of herbal drugs about a couple of years ago. Similarly PCSIR Laboratory, Peshawar also reported standardization of about hundred herbal drugs. These reports had provided the results of some analytical parameters like ash content, soluble extractable matter etc. of herbs but no attempt was made to establish the standard and specifications of these herbs against which similar herbs could be standardized. The major constraint in this respect seemed to be the nonavailability of authentic specimens of herbal drugs for establishing their standard specifications. Thus the reported attempts of standardization of herbs were of limited value. Before trying to establish specifications of the herbal drugs, the need was however felt to do some comparative study of the selected herbs already in use in the traditional practice to human and the extent of variation between similar species of drugs collected from different parts of the country. It was with this object in view that the National Institute of Health, Islamabad started a programme of

testing some single herbal drugs which were commonly used by the practitioners of Islamic medicine in their day-to-day practice.

EXPERIMENTAL

Four samples of the same species of drugs representing some leading manufacturers were collected from the four main cities of Pakistan namely Karachi, Lahore, Rawalpindi and Peshawar.

These samples were tested according to the same criteria as laid down in the British Pharmacopoeia for crude drugs i.e. the drugs were subjected to the following tests.

1. Description.
2. Macroscopical characters.
3. Total ash.
4. Acid insoluble ash.
5. Foreign organic matter.
6. Water soluble extractive.
7. Alcohol soluble extractive.
8. Moisture content.

The results were then compiled and it was observed that in the same species of drugs collected from four different localities/places, there were found to be great variations in almost all the parameters tested showing lack of uniformity in their quality. Evidently any formulation made out of these herbs will show lack of uniformity and quality. However, in the absence of authentic specimens of these herbal drugs it was difficult to say which one was genuine or not.

DISCUSSION

There are around 53,000 registered practitioners of Islamic medicine in Pakistan. These practitioners are estimated to be catering about 60% of the population mostly living in the rural areas of the country. They employ either single herbs or mostly compound herbal preparations in their day-to-day practice. Tibbi Pharmacopoeia

which is being followed in the traditional practice provides about 900 single herbs and minerals besides including formulation of 550 compound preparations. Another authentic book of recipies followed in traditional practice i.e. "كتاب المجربات" describe about 1250 compound preparations mostly based on herbal drugs. Besides, Hamdard Pharmacopoeia describes innumerable single herbs and compound preparations giving their therapeutic classification.

These drugs are presently being prescribed and used without any quality control checks on scientific lines except perhaps in few cases where some arbitrary standards have been provided. In fact the above quoted sample study has already supported that some of the herbs under study lack quality and uniformity. About a couple of decades ago no such emphasis used to be given to the quality control aspect of herbal drugs and their formulations because in those days such drugs were far and few and they were prepared by or under the supervision and care of healers themselves ensuring their quality to some extent. With the development of herbal drugs trade and industry and also the related technology, these medicines are being manufactured at present on commercial scale necessitating their standardization and quality control on scientific lines.

Though the number of drug manufacturers may run into hundreds there are around ten leading manufacturers of Islamic medicine in Pakistan whose annual turnover is quite substantial and comparable to some big multinational manufacturers of allopathic drugs. They are equipped with some modern facilities for tablet and liquid preparation manufacturing. With the production of these drugs on modern scientific lines surely there is a need for their quality control on the same lines. As providing standards and specifications for innumerable mostly compound herbal drugs is an extremely difficult task to achieve. Attempt should be made to establish standards and specifications for single herbal drugs to begin with. According to a survey carried out in Pakistan few years ago, there are

about 200 herbal drugs most commonly used by the traditional healers in their day-to-day practice. As a first step towards standardization serious efforts should be made to establish specifications for these. For this purpose authentic specimens of these drugs will have to be made available through local sources.

Another problem with the quality of herbal drugs is their contamination with microorganism and pests. The herbal drugs are liable to microbial contamination specially with *Pseudomanas sp.* Such drugs could prove harzardous to health and needs sterilization. Ethylene oxide gas can be used with advantage for such sterilization under controlled conditions.

But the most effective way of achieving Quality Assurance of Islamic medicine is through the application of certain controls on their manufacture. It is an established fact that the quality of any drug or medicine whether allopathic or herbal cannot be checked or controlled in any analytical laboratory but it has to be built into the product right from the beginning. That was the reason why the concept of Good Manufacturing Practices (G.M.P.) was incorporated into the Drug Legislations of all these countries engaged in the manufacturing of allopathic drugs. In the absense of quality control standards and specifications as well as analytical methodology, the manufacture of Islamic medicine should be subjected to G.M.P. through legislative measures to ensure their quality. G.M.P. includes control on the quality of starting materials i.e. herbal drugs and additives, cleanliness and efficiency of the equipment used in manufacturing, the quality of personnel i.e. their qualification, experience, hygienic conditions in the manufacturing area, the effectiveness of the methods of operations etc. So the G.M.P. which lay great emphasis on Men, Machines and Methods can provide good assurances of quality of these medicines.

A phased programme will have to be chalked out to achieve the above objectives.

Short term programme should include:

1. Providing standards and specifications of most commonly used single herbs.
2. Decontamination of herbal drugs before processing and ensuring proper storage conditions.
3. Application of Good Manufacturing Practices on the manufacture of Islamic medicine.

Long term programme should aim at providing standards and specifications for the identity, purity and quality of herbal drugs by developing suitable methodology through the application of modern analytical techniques like chromatography, spectrophotometry etc.

These objectives cannot be achieved without limiting and standardizing the innumerable odd formulations/dosage forms.

The Draft legislation to ensure the efficacy and equality of herbal drugs prepared by the Ministry of Health in Kuwait and the Islamic Organisation for Medical Sciences with the collaboration of EMRO is indeed a valuable document to achieve the above objectives.

CONCLUSION

Since the drugs used in the Islamic medicine may be spurious, adulterated or may not contain genuine species of herbs, there is an urgent need for the control of quality of such drugs so that they may exert their proper therapeutic effect rather than a health hazard. While it is admittedly not possible to lay down standards for all these drugs employed in the Islamic medicine, serious attempts should be made to find some workable standards for the most commonly used important drugs on the lines suggested above to save the consumers from the possible injurious effects of spurious, adulterated or substandard drugs.

HERBAL DRUGS IN TURKEY

Dr. Bayhan Cubukcu

TURKEY

sources giving us information about our traditional medicines. Some of these medicines have turned to be folkloric or modern medicines today.

I- FOLKLORIC HERBAL MEDICINES

[illegible] herbal drugs are available: People either picked the raw materials for their treating and medications from nature, or they got them from the herbalists, sellers at the markets, peddlers [illegible] from the pharmacies.

Herbalists (Aktar in Turkey) the main sources of supplying drugs to the public in [illegible]. The practice of herbalists [illegible] Anatolia from 12th and 13th centuries (A.C.). They were [illegible] supplying [illegible]. The regulations started in 19th century [illegible] pharmacists and [illegible] the herbalists [illegible] with the pharmacists.

During the time of the Ottoman Empire, the shops of the herbalists were located mostly in the covered [illegible] [illegible]

HERBAL DRUGS IN TURKEY*

Dr. Bayhan Cubukcu
TURKEY

The great difference in the forms of medicines available today, and also the important increase in the number of synthetic drugs lead us to think at first glance that the herbal drugs have been withdrawn from treatment. Therefore, many researches have been made recently in almost every country of the world to determine the real position of herbal drugs in treatment. The studies have shown in consequence that the herbal drugs hold a significant place in treatment as they have been with us for centuries, they have lower side effects or are better known and are generally cheaper to obtain.

We also have tried to determine where the phytotherapy is in our country[1-5]. Turkey has a very rich flora of great variety. The total number of plant species growing in Turkey today is estimated to be about 10,000[6]. This richness in variety has also influenced the use of plants as remedies for ailments. It is known that some plants were used in treatment in Anatolia in the days of Hittites during 20th Century (B.C.). It is not a mere coincidence that "Materia Medica", one of the pioneer books on the therapeutic use of medical plants, was written by Dioscorides (1st. Cent. A.C.) who had lived in Anatolia, around Adana.

After the Hittites, the Anatolian Civilizations have followed one another and their works on folkloric medicines, both written and oral, have reached us in consequence.

Books written in the days of the Ottoman Empire, which is a period reflecting the Islamic Civilization, are the most important

* Bulletin of Islamic Medicine, 3:422-431, 1984.

sources giving us information about our traditional medicines. Some of these medicines have turned to be folkloric or modern medicines today.

I - FOLKLORIC HERBAL MEDICINES

Sources where herbal drugs are available: People either collect the raw materials for their traditional medicines from nature, or they buy them from the herbalists, sellers at the markets, peddlers or rarely from the pharmacists.

Herbalists: Today in Turkey the main source of supplying drugs to the public is the herbalist. The presence of the herbalists is known in Anatolia since 12th and 13th centuries (A.C.) They were the mere source supplying herbal remedies to the customers in the old centuries. The regulations drafted in 19th century gave this duty to the pharmacists and the drugs the herbalists could sell were restricted with regulations.

During the days of the Ottoman Empire, the shops of the herbalists were found mainly in the capital cities like Bursa, Edirne and Istanbul. Today they are again present in the big cities like Bursa and Istanbul though they have diminished in number.

The Herbalists of Istanbul: The herbalists were found in different places in Istanbul up to the foundation of the Egyptian Bazaar in 17th century (1662). The bazaar was restored while the New Mosque was built, and it was devolved to the mosque. Then the tradesmen and merchants selling the same sorts of products were brought together. The bazaar was arranged for the herbalists and cotton-sellers only, and according to some records in 19th century, of the 100 shops present, 49 belonged to the herbalists.

In the days the bazaar was built, the drugs came there from Arabia and India via Egypt; so the bazaar was called "Egyptian Bazaar" "Spice Market".

Today, the two main places where the herbalists are found

together are the "Egyptian Bazaar" and "Çemberlitas". The shops of the herbalists may also be found in various districts separately.

The herbal drugs sold by the herbalists: In list I is given some 200 herbal products (177) sold by the herbalists in Istanbul today. About 30 of these drugs are foreign-sourced and this makes 17% of the whole. This shows that about 80% of the herbal drugs in sale are obtained from Anatolia.

The Anatolian Herbalists: The herbalists found in the Anatolian cities other than Istanbul and Bursa have lost a great deal of their properties; they are now merely shops selling seeds. One can find local drugs in these shops such as *Flores helichrysi, Folia salviae, Herba sideritis, Radix ferulae, Tubera salep*, etc.

As for the small cities and districts, it is observed that the herbal drugs are sold by grocers, seed-sellers, in all sorts of shops and open markets.

District Markets (Outdoor Markets): Almost all the herbal drugs sold in the outdoor markets set up in every district once in a week are spices such as *Folia menthae, Herba origani, Fr. Piperis nigri, Fr. capsici*, etc.

Peddlers: The local fresh drugs are usually sold by peddlers both in Istanbul and in Anatolian cities. One can easily meet these peddlers in the courtyards of the mosques and markets of the districts. The herbal products they sell vary according to the regions and seasons. Among these drugs, we can mention *Flores helichrysi, Folia salviae, Fr. momordicae, Fr. ecballii*, etc.

Pharmacies: The number of herbal drugs sold in the pharmacies are extremely small and *Fl. chamomillae, Fl. tiliae and Fr. anisi* are the main ones of them. In an inquiry we realized in the Istanbul pharmacies in April 1982, we found out that these drugs were sold either singly or in compositions[7].

II - MODERN HERBAL DRUGS PRODUCED IN TURKEY

We made a research in 1978 to find out how much the herbal-origined drugs were used in Turkey[2], and saw that the number of herbal drugs used in medicines was about 1000 (937). This value is a very low one when it is compared with those of Belgium, England, France, Germany and Italy which were found to be 1,600, 5,000, 7,500, 12,000 and 7,500 respectively. In the same work, the number of plant species used in medicines was found to be 100 (96).

This time, we have examined the plants used in modern herbal medicines in 2 groups, taking the "Drug Index 1978" as our basis[8]. These two groups are - (A) the plants used in medicines as their active compounds and (B) plants used in medicines as they are or in the form of their galencial preparations.

A - Plants used in medicines as active compounds: Plants used in medicines as active compounds and their frequency of use in these medicines are shown in list II.

On the other hand, the herbal active compounds taking the first 10 places of the list giving the frequency of use of plants in medicines are as follows:

Opium alkaloids.................................. 130
Ascorbic acid 61
Ephedrine.. 53
Solanaceae alkaloids............................. 52
Xanthine alkaloids 36
Menthol... 36
Ergot alkaloids..................................... 24
Camphor 18
Rauwolfia alkaloids 14
Chinchona alkaloids............................. 9

B - Plants used in medicines as they are or in the form of their galenical preparations: Plants used in medicines in Turkey as they are or in the form of their galenical preparations and their frequency of use in these medicines are given in list III.

There are 80 plants in this list as it is seen, and their frequency of use in these medicines is 232. Excluding the antibiotics, 70% of the herbal-origined medicines contain herbal active compounds and 30% contain herbal drugs or their galenical preparations. In the list below is given the first 10 mostly used plants present in medicines as drugs or galenical preparations.

Atropa... 16

Mentha... 15

Thymus (Origanum)............................ 13

Citrus 13

Pinus 13

Uragoga ipecacuanha........................... 9

Cinnamomum cassia............................. 8

Jambosa caryophyllus 8

Pimpinella anisum................................ 8

Eucalyptus... 7

Apart from Atropa and Uragoga, the plants of this list are those containing volatile oils.

In a previous research of ours, we had found out that the frequency of use of plants in medicines in France, Germany and Italy in the form of their galenical preparations were 2.597, 2.213 and 1.128 respectively and it was shown that the value for Turkey was 232 which was a very low one[5].

CONCLUSION

It is observed that the contribution of plants to modern drugs in Turkey is 10 times less than that in France, Germany and Italy.

Anatolian people used to use herbal drugs for 4,000 years and they carry on using the traditional drugs as the modern herbal medicines are limited in number.

200 Anatolian plants which are used in modern herbal drugs in other countries are not used in Turkey[5].

All these results show that it is necessary to develop the modern herbal drugs in Turkey.

LIST I
THE MAIN HERBAL DRUGS SOLD IN TURKEY

Botanical Names	Turkish Names
Aetheroleum menthae	Nane esansi
A. myristicae	Küçük hindistancevizi yagi
A. rosae	Gül yagi
A. salviae	Adaçayi esansi
A. thymi	Kekik Yagi
Aloe	Sarisabir
Amylum	Nisasta
A. maranthae	Ararot
Aqua rosae	Gülsuyu
Benzoe	Asilbent
Bulbus scillae	Adasogani
Camphora	Kâfur
Carrageen	Deniz Kadayifi
Catechu	Kadihindi
Colophonium	Reçine, Kolofan
Cortex cascarillae	Amber Kabugu
C.cinchonae	Kinakina kabugu
C. cinnamomi	Tarçin kabugu
C. pini	Çam soymugu
C. quillajae	Panama kabugu
C. granati	Nar kabugu
C. thymiamatis	Buhur
Crocus	Safran

Flores althaeae	Hatmi çiçegi
Fl. caryophylli	Karanfil
Fl. chamomillae Romanae	Alman papatyasi
Fl. chamomillae ulgaris	Papatya çiçegi
Fl. eleagni	Igde çiçegi
Fl. granati	Nar çiçegi
Fl. hibisci	Bamya çiçegi
Fl. lavandulae	Lavanta çiçegi
Fl. rhoeados	Gelincik çiçegi
Fl. robiniae	Akasya çiçegi
Fl. rosae	Gül kurusu
Fl. sambuci	Mürver çiçegi
Fl. tiliae	Ihlamur çiçegi
Fl. verbasci	Sigirkuyrugu çiçegi
Fl. violae odoratae	Menekse çiçegi
Folia adianti	Karabaldir yapragi
F. aurantii amari	Turunç yapragi
F. caricae	Incir yapragi
F. cynarae	Enginar yapragi
F. eucalypti	Ökaliptüs yapragi
F. juglandis	Ceviz yapragi
F. lauri	Defne yapragi
F. lawsoniae	Kina yapragi
F. malvae	Ebegümeci yapragi
F. melissae	Melisa yapragi
F. menthae piperitae	Nane yapragi
F. mori nigrae	Karadut yapragi

F. mytri	Mersin yapragi
F. rhois coriariae	Sumak yapragi
F. rosmarini	Biberiye (Kusdili) yapragi
F. rubi fruticosi	Bögürtle yapragi
F. salviae	Adaçayi yapragi
F. sennae	Sinameki yapragi
F. stramonii	Boruçiçegi yapragi
F. theae	Çay yapragi
Fructus anisi vulgaris	Anason
Fr.apii	Kereviz tohumu
Fr. arbuti	Kocayemis
Fr. arecae	Farfelek
Fr. capsici	Kirmizi biber
Fr. cardamomi	Kakule
Fr. cassiae fistulae	Hiyarsembe
Fr. conii	Baldiran
Fr. coriandri	Kisnis
Fr. corni	Kizilcik Kurusu
Fr. cubebae	Kübabe
Fr. cumini	Kimyon
Fr. foeniculi	Rezene, Raziyane
Fr. gundeliae	Kenger tohumu
Fr. jujubae	Hünnap meyvasi
Fr. juniperi	Ardiç tohumu
Fr. lauri	Defne tohumu
Fr. paluiri	Çesmezan
Fr. petroselini	Maydanoz tohumu

Fr. piperis nigri	Karabiber
Fr. pimentae	Yenibahar
Fr. rosae caninae	Kusburnu
Fr. silybi mariani	Devedikeni tohumu
Fr. terminaliae	Karahalile
Fr. terminaliae citrinae	Sarihalile
Fr. vanillae	Vanilya
Gallae quercinae	Mazi
Gummi arabicum	Arap zamki
G. olibanum	Akgünluk
G. tragacanthae	Kitre zamki
Gummi-resina ammoniacum	Çadir usagi
Herba absinthii	Pelinotu
H. artemisiae	Ayvadana
H. equiseti	Kirkkilit otu
H. fumariae	Sahtere otu
H. hyperici	Kantaron
H. origani	Kekik otu
H. parietariae	Yapiskan otu
H. plantaginis majoris	Sinirli yaprak otu
H. rutae	Sedefotu
H. sideritis	Dag nanesi
H. stachydis	Karabas otu
Lignum santoli rubrum	Kirmizi sandal
L. quassiae	Aci agaç
Manna	Kurdret helvasi
Macis	Besbase

Mastix	Sakiz
Oleum amygdalae expressum	Badem yagi
O. cacao	Kakao yagi
O. coryli	Findik yagi
O. juglandis	Ceviz yagi
O. lauri expressum	Defne yagi
O. momordicae	Kudret nari yagi
O. ricini	Hint yagi
Pericarpium aurantii amari	Turunç kaugu
P. citri	Limon kabugu
P. juglandis	Ceviz kabugu
Pix juniperi	Ardiç katrani
Pix liquida	Çam katrani
Pulpa tamarindorum	Demirhindi pulpasi
Radix alkannae	Havaciva kökü
R. althaeae	Hatmi kökü
R. asphodelini	Çiris otu kökü
R. chicorii	Hindiba kökü
R. gentianae	Defneyezit kökü
R. liquiritiae	Meyan kökü
R. pyrethri	Udukahir Nezleotu kökü
R. rubiae	Boyaci kökü
R. saponariae	Çögen kökü
R. sarsaparillae	Saparna kökü
R. scirpi	Saz kökü
R. valerianae	Kedi otu kökü
Resina pini	Çam sakizi

Rhizoma calami	Egir kökü
Rh. curcumae	Zerdeçöp
Rh. galangae	Havlican
Rh. graminis	Ayrik otu kökü
Rh. iridis	Menekse kökü
Rh. rhei	Ravend rizomu
Rh. zedoariae	Zulumba
Rh. zingiberis	Zencefil
Semon amomi	Itrifil
S. amygdalae amara	Acibadem
S. brassica napus	Salgam tohumu
S. basilici	Reyhan tohumu
S. cannabis	Kenevir tohumu
S. coffeae	Kahve çekirdegi
S. cucurbitae	Kabak çekirdegi
S. cydoniae	Ayva çekirdegi
S. dauci	Havuç tohumu
S. foenugraeci	Çemen tohumu
S. gossypii	Pamuk tohumu
S. helianthii	Ayçiçegi
S. hippocastani	At kestanesi
S. lini	Keten tohumu
S. lupini	Aci bakla, Yahudi baklasi
S. mori nigrae	Karadut tohumu
S. myristicae	Küçük hindistan cevizi
S.nigellae	Çöre otu, Çörek otu tohumu
S. papaveris	Hashas tohumu

S. Pegani	Üzerlik tohumu
S. pruni persicae	Seftali çekirdegi
S. pruni mehaleb	Mahlep tohumu
S. psylli	Karniyarik tohumu
S. sabadillae	Bitotu tohumu
S. sesami	Susam
S. sinapis	Hardal tohumu
S. staphysagriae	Mezvek, Karaot, Karaca otu, Bitotu
S. strychni	Kargabüken
S. urticae	Isirgan tohumu
S. visci	Çekem tohumu
Stylus maydis	Misir püskülü
Styrax liquidus	Günlük
Succus elaterii	Yabani hiyar
S. liquiritiae	Meyan bali
Terebinthina	Terementi, Çam sakizi
Tubera cyclameni	Topalak
T. salep	Salep yumrusu
Valonea	Palamut

LIST II
PLANTS USED IN MEDICINES AS ACTIVE COMPOUNDS AND THIER FREQUENCY OF USE

Acacia senegal	4
Ascorbic acid (Vit. C)	61
Atropa (Atropine, hyocyamine and derivatives)	30
Capsicum	1
Carica papaya	1
Caryophyllus	1
Cascara sagrada	1
Cassia	2
Catharanthus	2
Centella asiatica	1
Chinchona	9
Cinnamomum camphora (Camphre)	18
Claviceps	24
Coffea	67
Cynara	1
Datura	22
Digitalis	7
Ephedra (Ephedrine)	53
Eucalyptus (Eucalyptol)	7
Fraxinus (Mannitol)	2
Leuconostoc (Dextran)	1
Mentha	36
Papaver somniferum	130
Pausinystalia	1
Peumus	1
Pilocarpus (Pilocarpine)	1
Podophyllum	1
Quercus and tannin	5
Rauwolfia	14
Scilla maritima var. alba	1
Sophora (Rutoside)	1
Strophanthus	2
Strychnos	2
Thea	12
Thymus	3
Uragoga	2
Vanilla	2
Veratrum	1

LIST III

PLANTS WHICH GIVE THE HERBAL DRUGS THAT ARE USED IN MEDICINES AS THEY ARE OR IN THE FORM OF THEIR GALENICAL PREPARATIONS AND THEIR FREQUENCY OF USE IN THE MEDICINES

PLANTS GROWING IN TURKEY

Acorus calamus.................... 1
Adiantum capillus veneris 3
Aesculus hippocastanum (c) 1
Atropa belladonna 16
Capsicum annum (c) 10
Citrus aurantium (c) 12
Citrus bergamiae (c) 1
Crataegus oxyacantha............ 1
Crocus sativus (c)................. 2
Cynara scolymus (c) 1
Drosera............................ 1
Eucalyptus 7
Faex medicinalis 2
Foeniculum vulgare 2
Hyoscyamus 3
Hypericum perforatum 1
Juniperus communis 4
Lactuca............................ 1
Laurus nobilis 1
Lavandula spica.................... 6
Linum usitatissimum (c) 1
Liquidamber orientalis............ 1
Matricaria chamomilla........... 3
Melissa officinalis.................. 2
Mentha piperita (c)............... 16
Olea europea (c).................. 1
Origanum.......................... 1
Papaver rhoeas.................... 2
Papaver somniferum (c) 5
Passiflora incarnata (c).......... 2
Pimpinella anisum (c)............ 8
Pinus.............................. 13
Prunus amygdalus (c)............ 1
Prunus laurocerasus 1
Quercus infectoria................. 1
Rhamnus frangula................. 4
Ricinus communis (c) 4
Rosa (c)........................... 4
Rosmarinus officinalis (c) 2
Salix alba.......................... 1
Thymus vulgaris................... 15
Valeriana officinalis 1
Viola odorata...................... 1

LIST III
PLANTS WHICH GIVE THE HERBAL DRUGS THAT ARE USED IN MEDICINES AS THEY ARE OR IN THE FORM OF THEIR GALENICAL PREPARATIONS AND THEIR FREQUENCY OF USE IN THE MEDICINES

FOREIGN-ORIGINED PLANTS

Acacia senegal 4
Aconitum napellus 1
Aloe ferox 4
Carica papaya 1
Cassia angustifolia 5
Centella asiatica 1
Chinchona 2
Cinnamomum camphora 8
Geranium robertianum 1
Hydrastis canadensis 1
Jambosa caryophyllus 8
Lobelia inflata 1
Melaleuca viridiflora 1
Myristica fragrans 1
Myroxylon balasamum 3
Myroxylon pereirae 5
Peumus boldus 1
Podyphyllum peltatum 1
Cinnamomum casia 8
Cocus nuciferae 2
Cola nitida 3
Commiphora abyssinia 3
Curcuma aromatica 1
Erythroxylon coca 1
Ferula galbaniflua 1
Gelidium amansii 1
Quillaja saponaria 1
Rauwolfia serpentina 1
Rheum palmatum 3
Rubus fruticosus 4
Strychnos nuxvomica 1
Styrax tonkinensis 4
Theobroma cacao 1
Uragoga ipecacuanhae 9
Vanilla planifolia 1
Zingiber officinalis 1

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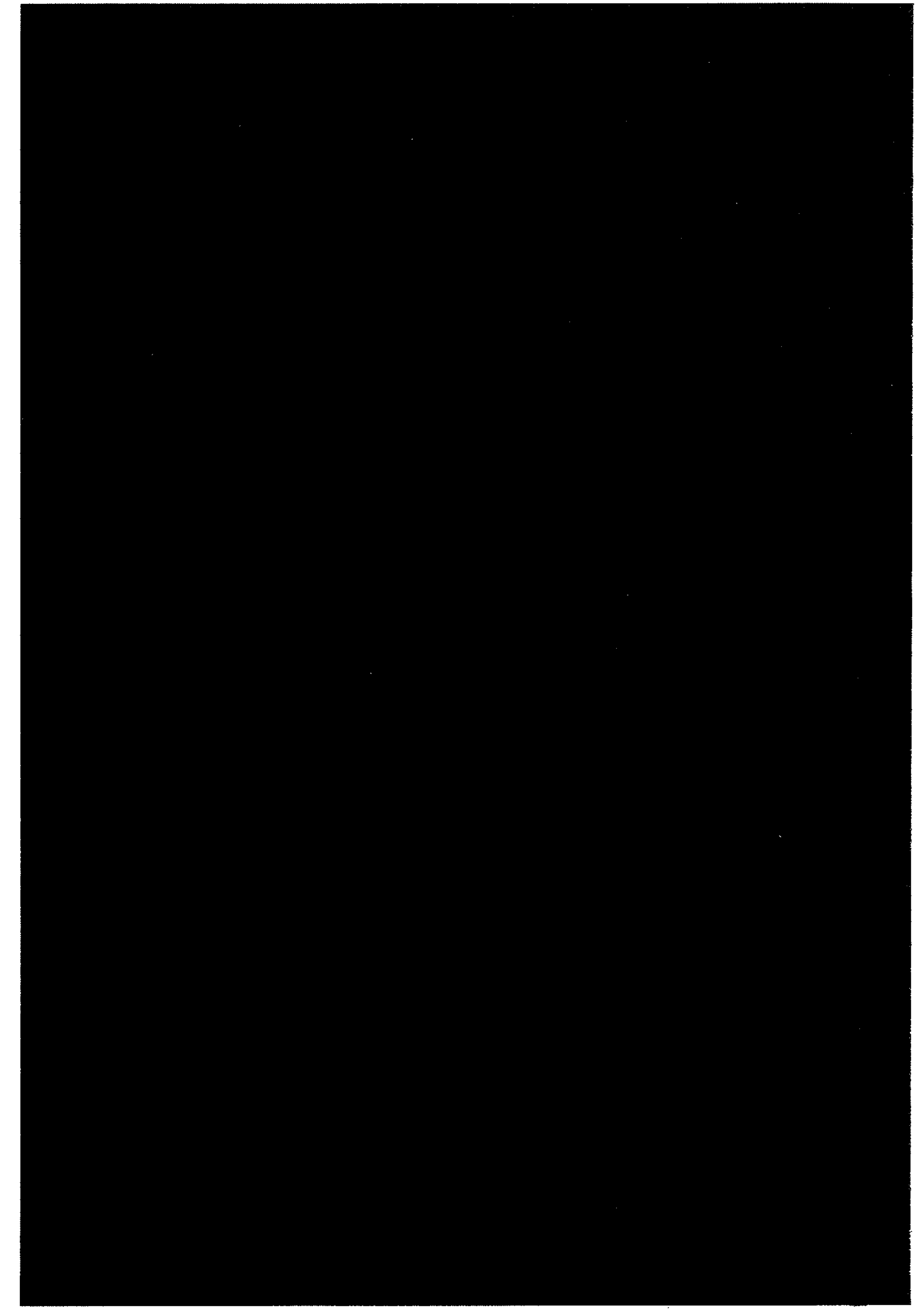
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SAUDI MEDICINAL PLANTS AND THEIR CONTRIBUTION TO ISLAMIC MEDICINE

Dr. Mohammed Abdulaziz Al-Yahya

SAUDI ARABIA



SAUDI MEDICINAL PLANTS AND THEIR CONTRIBUTION TO ISLAMIC MEDICINE*

Dr. Mohammed Abdulaziz Al-Yahya
SAUDI ARABIA

INTRODUCTION

Arabian peninsula is the birth place of herbal drugs, the use of folk medicine has existed here since the time immemorial. According to ancient Arabian physicians there is no disease that cannot be cured by plants. The knowledge of herbal medicine has been carried from generation to generation, which has helped in building up of a rich heritage of folk medicine in this region of the world. Although the tide of the synthetic medicine has greatly suppressed the use of crude drugs of natural resources, still a large number of people of different countries have faith in this system of medicine and use herbal drugs to alleviate their sufferings[1-11]. Apart from effectiveness and easy availability, these drugs are more suitable to the climatic conditions that prevail in these countries.

Arabs have made a lot of contribution for the development of herbal medicine during the middle ages. Galen in second century AD was an extremely prominent authority on plant medicine, even today the term Galenical is applied to simple vegetable extractives.

During the golden age of Islamic Tibb, the researches and writings of Arab physicians stood on a firm foundation which was based on their extensive thoughts and experience. The Arab medical sciences propagated very fast throughout the world with the propagation of Islam. The pilgrimage to Makkah and Al-Madinah by the Muslims

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favoured the spread of this science. The students and researchers from Spain, Africa, Asia and other countries had many chances to contact with Arab physicians and scholars.

The Kingdom of Saudi Arabia is rich in its plant resources (more than one thousand plants have been mentioned in Flora of Saudi Arabia). A large number of herbal drugs are still being used in the Arabian folk medicine, only very few of these plants have been studied for their chemical and biological properties[12-16].

The need to evaluate phytochemical constituents and their biological activities is not only important for the development of new therapeutic agents but the novel chemicals isolated from plants with some biological activity give a guideline to the chemist to synthesise very useful semi-synthetic drugs such as homatropine from atropine. Studies on the toxic plants could help in the diagnosis and treatment of poisoning in man and animals caused due to their ingestion, on a more rational basis. They may lead to the development of specific antidotes[17]. The lack of interest in the biological evaluations of crude plant preparation has been a major obstacle in the development of drugs from natural resources[18].

Realizing these facts the scientists in the Kingdom are now taking initiative to work on a more systematic and organized manner to evaluate therapeutic efficacy and side and toxic effects of herbal drugs used in folk medicine. The present study is an attempt to enlist some of the drugs used in the Kingdom of Saudi Arabia in various ailments with special reference to their botanical and vernacular names, family, habitat, chemical constituents and medicinal uses. The phytochemical and biological studies have been undertaken in our laboratories on ten of these medicinal plants.

MATERIALS AND METHODS

A list of fifty Saudi Medicinal plants, which are used in folk medicine has been prepared on the basis of surveys of different

regions, interviews made with herbal practitioners and literature available. The plants were collected from different regions of Saudi Arabia in sufficient quantities and identified by an expert taxonomist to determine their botanical names and family. The data collected included vernacular names of the plant in Arabic, geographical and ecological distribution, parts used, chemical constituents, pharmacological actions and medicinal uses. The details are mentioned in Table 1.

Pharmacognostical, phytochemical, pharmacological, biochemical, haematological, antimicrobial and toxicological studies are being undertaken on these plants to justify their therapeutic use and toxicity. The data of 10 plants have been presented in this report.

1. PHYTOCHEMICAL SCREENING

200 gms of plant material were ground to make coarse powder. The qualitative chemical analysis of the powder was carried out for the presence or absence of alkaloids, cardiac glycosides, cynogenic glycosides, anthraquinones, flavonoids, saponins, coumarins, sterols and triterpenes, tannins, glucosinolates, volatile oils and volatile bases according to the methods mentioned by Farnsworth[17]. About 500 gms of the dried powder of the plant were extracted successively in a Soxhlet, first with non-polar solvent (chloroform), then with polar solvent (96% ethanol). The solvents were removed at low temperature under reduced pressure and the extracts were stored in refrigerator for biological studies.

2. PHARMACOLOGICAL STUDIES

i) Neuropharmacological Screening

Neuropharmacological studies were carried out in mice, weighing 30-40 gms, according to the scheme of Irwin[19]. Ethanol extract in the dose of 500 mg/kg of body weight was administered

intraperitoneally, the animals were observed for excitation, tremors, twitches, motor activity, motor co-ordination, pinna, corneal reflexes and respiratory changes. Rectal temperature was recorded and mortality within 24 hours was noted.

ii) Cardiovascular Screening

The effect of the plant extracts on blood pressure and heart was studied. Blood pressure studies were carried out on normotensive rabbits of either sex, weighing 1.5 to 2 kg. The animals were anaesthetized with 25% urethane (1.5 to 2 g/kg i.v.). Supplement doses of the anaesthetic were given via polyethylene cannula advanced from jugular vein. The cannula was connected through carotid artery to Stathem pressure transducer for recording of B.P. on a Narco physiograph. Femoral vein was cannulated for the administration of plant extract.

Effect of the drug on heart was recorded using isolated rabbit heart (Langendorff's preparation) using Ringer's solution. Force of contraction of heart was recorded on Narco physiograph using Myograph F60 transducer.

iii) Smooth and Skeletal Muscle Studies

The effect of plant extracts on smooth muscle was studied on isolated guinea pig ileum. Guinea pigs of either sex weighing 300-400 gms (fasted overnight) were killed by a blow on the neck and bled out. The abdomen was opened and 2 cm ileum from the ileocaecal junction was taken out and hanged in a tissue bath containing Tyrode's solution (Bath solution was continuously aerated and maintained at 37° C). The extract was added to the bath and contraction or relaxation produced was recorded using a Myograph F60 transducer on a Narco physiograph. Antagonism or potentiation of acetylcholine and histamine induced contraction was also studied.

Skeletal muscle studies were carried out on frog's rectus abdominis muscle. The rectus muscle was suspended in a bath

containing frog Ringer solution with a constant supply of oxygen. The muscle was stretched with a load of 2 gms for 30 minutes before the responses of the drug were observed. Contraction induced by the extract and antagonism or potentiation of acetylcholine were recorded on a Narco physiograph.

3. BIOCHEMICAL AND HAEMATOLOGICAL STUDIES

The effect of plant extracts were studied on the haematology of rats. The animals were treated with 400 mg/kg body weight of extract intraperitoneally, two hours following the administration of extracts the rats were sacrificed and blood samples were collected for biochemical, haematological and coagulation studies. The results are mentioned in Table 2.

i) Studies on Glucose, Cholesterol and Electrolytes in Serum

Serum cholesterol and glucose levels were determined spectrophotometrically using Biomerix Kits. Serum electrolytes were estimated using flame photometer.

ii) Haematological Studies

The effect of alcoholic and chloroform extract in the dose of 400 mg/kg body weight of rat was studied on red blood cells (RBC), white blood cells (WBC) and haemoglobin using Contraves Digcell 3100h Haematology system (Contraves AG Zurich).

4. MICROBIOLOGICAL STUDIES

The ethanol and chloroform extracts of plants were tested for their antimicrobial activities. The extracts were tested against standard strains of *Staphylococcus aureus, Escherichia coli, Proteus vulgaris, Pseudomonas aeruginosa, Candida albicans* and *Bacillus subtilis*. The parameter included radial streaking on the agar containing 1 and 2 mg concentrations of extract, disc-agar-diffusion, where each disc carried 1 and 2 mg concentrations of

extract and minimum inhibitory concentration (MIC), using tube dilution method[20].

RESULTS AND DISCUSSION

The preliminary studies related to the prevalence and distribution of herbal traditional drugs in the Kingdom of Saudi Arabia revealed that this system still enjoys popularity in rural and urban areas of the Kingdom. In spite of a very efficiently organized channel of health care centers and availability of all modern drugs, many people still have faith in the folk medicine and use herbal drugs to alleviate their sufferings. The system is not well organized, elderly people and house wives in the families know quite a good number of herbal drugs for the treatment of minor ailments. Almost each little Hojrah or village has herbal folklorist who often prescribes herbs for common diseases. The medicinal herbs growing in one part of the country are also used in the other regions of the country indicating the consistency in the medicinal use of different plants. It was observed that most of the phytotherapists try to conceal the information they have about the names and curative properties of herbs they use for the healing purposes. However, many of these herbalists are very cooperative and parted with the information they had about the herbal drugs, especially for the academic purpose. Based on this informations a list of 50 medicinal plants has been prepared which gives the details regarding the Arabic names, family and species of the medicinal plant, with geographical and ecological distribution, parts used and therapeutic usefulness. The literature was surveyed and it was found that most of these plants have never been studied for their chemical and biological properties. Out of the list of fifty, 10 plants namely *Alhagi maurorum, Artemisia herba-alba, Calotropis procera, Cressa cretica, Heliotropium europaeum, Marrubium vulgare, Peganum harmala, Periploca aphylla, Tamarix aphylla* and *Thumus vulgaris* were studied in our laboratories for their phytochemical and

biological properties. The results are depicted in Table 2. Our phytochemical studies revealed that most of these plants are rich in sterol and/or triterpenses, flavonoids, alkaloids, coumarins, and cardiac glycosides contents, these constituents might be responsible for their therapeutic values. Preliminary pharmacological screening on ethanolic extracts of these plants showed that 20% of these plants increase force of contractions of myocardium, 30% have tranquillizing/depressant effect on central nervous system, 20% produced relaxation of smooth muscle. Our results on biochemical study showed that the ethanolic extracts of *Marribium vulgare* has significant hypocholestraemic effect and might be useful in patients with atheroclerosis, while the ethanolic extracts of *Peganum harmala* and *Galotropis procera* have hyperglycaemic and hyperkalaemic activity respectively.

Antimicrobial studies showed that *Thymus vulgaris* has a highly significant antibacterial and antifungal activity, the ethanolic extract of this plant was found to have bacteriostatic effect against *S. aureus, Pr. vulgaris, C. albicans* and *B. subtilis* microorganisms. The growth of *B. subtilis* was inhibited by *Artemisia herba-alba* and *Heliotropium europaeum*, while the ethanolic extract of *Tamarix aphylla* was found to be effective against *Pr. vulgaris*. The results of this study clearly indicate that the herbal drugs being used in the folk medicine have significant biologically active constituents and the systematic studies on the pharmacology and toxicity suggested to justify the basis of therapeutic use of these herbs to cure various ailments of human beings.

SUMMARY

The scientific literature on fifty plants, which have been used in the folk medicine for the last many decades in Saudi Arabia, have been briefly reviewed. Ten of them were subjected to further pharmacognostical, phytochemical, pharmacological, biochemical, haematolo-

gical and antimicrobial studies in our laboratories. They have been found to possess chemical constituents of varying nature i.e., alkaloids, cardiac glycosides, flavonoids and coumarins, etc. Some of these plants exhibit promising pharmacological activities. It was worthwhile to note that one of them. *M. vulgare* possesses significant hypocholestremic activity while others showed cardiac stimulant, CNS depressant and smooth muscle relaxant activities. Few of them were found to be effective against the microorganisms, *Pr. vulgaris, C. albicans* and *B. subtilis* in the antimicorbial screening tests. These observations provide justification for further detailed studies on the pharmacology and toxicity of these plants in order to establish a rationale for their therapeutic usefulness.

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TABLE 1

CLASSIFICATION AND PROPERTIES OF MEDICINAL PLANTS OF SAUDI ARABIA

Sl. No	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal uses	Pharmacological properties.
1.	ASCLEPIADACEAE *Calatropis procera* (Ait.) Ait. F.	S. Hijaz, Nefud, Najd N., S. and E. Regions.	Calotropin, Calotropagenin, Calotoxin and Calactin.	Rheumatic pains, elephantiasis, leprosy, cough.	Diaphoretic, expectorant, Emetic (Root bark); Purgative, rubefacient, caustic, abortifacient (Latex).
2.	*Periploca aphylla* Decne.	S. Hijaz and Najd.	Resin, tannin and glucoside.	Cerebral fevers, swellings and tumours.	Stomachic, febrifuge, and purgative.
3.	BORAGINACEEAE *Heliotropium europaeum* Linn.	N. and S. Hijaz & E. Region.	Alkaloids	Snake bite.	Emetic.
4.	COMPOSITAE *Artemisia herba-alba* Assoc.	Najd, N. & E. Regions.	Sterols, flavonoids, minerals and amino acis.	Intestinal worms.	Anthelmintic.
5.	CONVOLVULACEAE *Cressa cretica* Linn.	N. and S. Hijaz, Najd, Rub-Al Khali, N.E. Regions	Alkaloids, sterols and fatty acids.	General weakness and sexual debility.	Tonic, aphrodisiac, expectorant, antibilious.
6.	LABIATAE *Marrubium vulgare* Linn.	S. Hijaz and S. Region.	Alkaloids, glycoside, volatile oil, fixed oil, resin, tannin, fat and vitamin.	Ch. bronchitis, cough, dyspepsia, jaundice, amenorrhoea, rheumatism.	Stimulant, expectorant, resolvent, anthelmintic, alterative.
7.	*Thumus vulgaris* Linn.		Volatile oil, triterpenoid, saponins, flavonone, Caffeic acid, tannins and resin.	Rheumatism, skin diseases, whooping cough, bronchitis, hookworms, intestinal antiseptic.	Antiseptic, anthelmintic, expectorant, carminative, diuretic, emmanagogue, sedative, antispasmodic, antifungal.
8.	LEGUMINOSAE *Alhagi maurorum* Medic.	Najd, N. Hijaz. N. and E. Regions.	Tannin, Coumarin, flavonoids, ascorbic acid.	Rheumatism, migrane, general debility.	Laxative, diuretic, expectorant, diaphoretic, restorative, aperient, aphrodisiac.

table 1 contd...

Sl. No	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal uses.	Pharmacological properties.
9.	MALVACEAE *Abutilon figarianum.* Webb.	Southern Region and . Hijaz.	Mucilage and Asparagin.	Fever (root), Diuresis (bark).	Diuretic, demulcent, laxative (seeds), astringent (bark)
10.	*Gossipium arboreum* Linn.	N. and S. Hijaz, E. Najd and E. Region.	Minerals; N. K_2O, Cl, Fe_2O_3 MgO.	Fevers (root); gleet, catarrh, Gonorrhoea, cystitis (seeds)	
11.	*Malva parviflora* Linn.	N. Hijaz, E and W Najd, Nefud, Rub-al-Khali, N and E Regions.	Amino acid and fatty acid	Cough and bladder ulcers (seeds) Poultice for wounds, bruised limbs, tape worm (leaves).	Demulcent, nerve tonic, and emmenagogue.
12.	*Sida alba* Linn.	S. Hijaz.	Alkaloids.	Gonorrhoea and fevers.	Demulcent, refrigerant, diphoretic and tonic.
13.	MELIACEAE *Melia azedarach.* Linn.	S. Hijaz and Najd.	Azaridin alkaloid, sugar, tannin and resin.	Round worms, leprosy, scrofula, nervous headache, glandular swelling.	Anthelmintic, stimulant and antispasmodic (bark); diuretic, antilithic, and emmanagogue (leaves).
14.	MOLLUGINACEAE *Gisekia pharanaceoids* Linn.	N. and S. Hijaz, E. Najd.	Tannins.	Taenia infection.	Aperient, aromatic, anthelmintic, purgative.
15.	*Glinus lotoides* Linn.	N. and S. Hijaz, S. and E. Regions.	Oils and fatty acids.	Tonic, bilious attacks, boils.	Purgative.
16.	*Mollugo cerviana* (L) Ser. in DC.	S. Hijaz and E. Najd.	Hydrocyanic acids, resin and gum.	To promote lochial discharge, gout and rheumatic complaints.	Stomachic, aperient, uterine stimulant, antiseptic and febrifuge.
17.	MORACEAE *Ficus carica* Linn.	S. Hijaz and S. Region.	Sugars, malic acid, citric acid, enzymes, fixed oil, ficusin, rutin and tannins.	Kidney and bladder stone, piles, weakness, ulcers.	Aperient, emollient, laxative, demulcent, tonic, antobtrusive.

table 1 contd...

Sl. No	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal uses.	Pharmacological properties.
18.	NICTAGINACEAE *Boerhavia diffusa* Linn.	N. and S. Hijaz, S. Region.	Punarnavine alkaloid, fat and Pot. nitrate.	Diseases of heart and kidneys, gonorrhoea, dropsy, asthma, oedematous swellings (root); jaundice (leaves juice).	Stomachic, laxative, diuretic expectorant, diaphoretic, emetic.
19.	OLEACEAE *Olea europea* Linn.	North Nijaz.	Glucoside and tannins.	Diarrhoea (fruit); intermittent fever, scrofula, blood spitting (haemoptysis), eye diseases (leaves and bark).	Astringent, tonic (fruit) smooth muscles relaxant (leaves and bark).
20	OXALIDACEAE *Oxalis corniculata* Linn.	S. Hijaz, Najd, E. and S. Regions.	Ascorbic acid, pyruvic acid, dehydroascorbic acid.	Fevers, billiousness, corns, warts, inflammation.	Refrigerant, astringent, antiscorbutic, appetiser, cooling.
21.	PAPAVERACEAE *Argemone maxicana* Linn.	N. and S. Hijaz	Alkaloids, berberine, protopine, argemexitin.	Blisters and indolent ulcers, material fevers, scabies (Juice); scorpion bite, tape worm and ch. skin diseases (root), Toothache (smoke of seeds).	Diuretic, alterative, hypnotic (Juice); Laxative, nauseant, emetic, expectorant and demulcent (seeds).
22.	*Papaver rhoeas* Linn.	E. and S. Regions.	Alkaloids, rhoeadine, morphine, narcotine and apomorphine; glucosides.	Sedation and narcosis (Juice); low fevers (leaves & seeds).	Narcosis and sedation, tonic.
23.	*Papaver somniferum* Linn.	E. Region.	Alkaloids, morphine, codein, thebaine, noscapine, narceine, papaverine; sugar.	Painful states, diarrhoea, dysentry, cough and asthma.	Astringent, narcotic, somniferous, sedative, anodyne, antispasmodic, aphrodisiac.
24.	PLANTAGINACEAE *Plantago lanceolata* Linn.	Najd and E. Regions.	Glucoside, fats, fixed oils, nicotinic acid, carotene and tannins.	Wounds, inflammed surfaces and sores.	Diuretic, purgative and haemostatic (seeds); anti-inflammatory (leaves).

table 1 contd...

Sl. No	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal uses.	Pharmacological properties.
25.	*Plantago major* Linn.	S. Hijaz and S. Region.	Resin, sterols, pectin, mucilage, glucoside, choline, protein, fat, organic acid.	Urinary discorders, dysentery and griping pain.	Demulcent, aperient, antispasmodic.
26.	*Plantago ovata* Linn.	E. and W. Najd, Rub-al-Khali, N. and E. Regions.	Mucilage, fixed fatty oils, proteins, glucoside.	Chronic diarrhoea and dysentry, gonorrhoea, urethritis, haemorrhoids, rheumatism and gout.	Demulcent and mildly astringent, diuretic.
27.	POLYGONACEAE *Emex spinosus* Linn.	E. and W. Nadj, N. and E. Regions	Antharaquinones.	Dyspepsia, biliousness, colic, stomach, disorders.	Stomachic, purgative, diuretic, antispasmodic, appetiser.
28.	*Rumex nepalensis* Spreng.	S. Hijaz.	Chrysophanic acid, nepodine, tannins, anthraquinone derivatives.	Intestinal parasites, colds and headache, abdominal pain.	Purgative, astringent, antispasmodic.
29.	*Rumex vesicarius* Linn.	S. Hijaz, E. Najd, S and E. Regions.	Rumicin, emodin, tannin, protein, fat, carbohydrates, Ca, P, Fe, thiamine, riboflavin, Vit. A and C, nicotinic acid.	Nausea, anorexia, dysentery, scorpion bite.	Stomachic, diuretic, astringent, antidote to scorpion sting.
30.	PORTULACACEAE *Portulaca oleracea* Linn.	N&S Hijaz, E. Najd and E. Region.	Alkaloids, glycosides, volatile oils, Vit. C, iron, fat, organic acids.	Scurvy, liver disorders, dysuria, haemoptysis, urinary disease.	Diuretic, refrigerant, alterative, astringent, emollient, demulcent.
31.	*Portulaca quadrifida* Linn.	N. and S. Nijaz.	Mucilage, potassium oxalate.	Skin diseases, erysipelas, dysuria, worms, urinary disorders.	Diuretic, vermifuge.

table 1 contd...

Sl. No	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal uses.	Pharmacological properties.
32.	RANUNCULACEAE *Nigella sativa*	N. Hijaz.	Alkaloid, ketones, terpenoids, aliphatic alcohols, volatile oils and fatty acid.	Indigestion, anorexia, fever, diarrhoea, dropsy, intestinal worms.	Digestive, stimulant, carminative, aromatic, diuretic, diaphoretic, stomachic, anthelmintic, emmanagogue.
33.	RHIZOPHORACEAE *Rhizophora mucronata* Lam.	S. Hijaz and S. Region.	Tannins.	Diarrhoea, dysentry, haematuria.	Astringent.
34.	ROSACEAE *Cotoneaster nummularia* Fisch. & Mey.	Najd and E. Region.	Hydrocyanic acid		Aperient, stomachic and expectorant.
35.	RUTACEAE *Ruta chalepensis*. Linn	S. Hijaz and S. Region.	Fixed oil, rutin.	Convulsions, fevers, catarrh, colics, amenorrhoea, epilepsy.	Antispasmodic, sudorific, abortifacient, anthelmintic, emmanagogue, rubifacient, antiepileptic.
36.	SALICACEAE *Salix tetrasperma* Roxb.	Najd and S. Region.	Tannin (bark) Ca. C. and N. (leaves).	Rheumatism, epilepsy, piles, bladder stones, VD, swellings, fevers.	Sedative, analgesic, antilithic (leaves): febrifuge (bark).
37.	SALVADORACEAE *Salvadora persica* Linn.	N. and S. Hijaz, S. Region.	Alkaloid, resin (bark); sugars, fat, alkaloid (fruit).	Scurvy, painful tumours, piles, rheumatic joints (leaves); fever, amenorrhoea (bark); bladder stones (fruit).	Aromatic, deobstruent, carminative, diuretic and anthelmintic (leaves); tonic, stimulant and emmanagogue (bark); digestive, lithotripic, diuretic and carminative (fruit).
38.	SAPINDACEAE *Dodonaea viscosa* Jacq.	N. and S. Hijaz, S. Region. E. Najd and E. Region.	Alkaloid, glycoside, resin, gum, tannins, flavonoids, sterols and saponins.	Gout, rheumatism, wounds, burns, fevers, sore throat.	Alterative, laxative, febrifuge, sudorific, tonic.
39.	SOLANACEAE *Datura fatuosa* Linn.	Najd, S. Hijaz and S. region.	Alkaloids, fixed oils and Vit. C.	Insanity, fever, catarrh, asthma cerebral complications, tuberculosis and diarrhoea.	Bronchodilator, sudorific, febrifuge.

table 1 contd...

Sl. No	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal uses.	Pharmacological properties.
40.	*Datura stramonium* Linn.	N. Hijaz, Nefud, E. Najd, S.N. and E. Regions.	Alkaloids, atropine, hyoscine amd hyoscyamine.	Colics, rheumatism, gout, bronchitis and asthma.	Antispasmodic, anodyne, narcotic, sedative, bronchodilator.
41.	*Hyoscyamus muticus* Linn.	S. Hijaz and Najd.	Alkaloids, hyoscine, amd hyoscyamine.	Colics, asthma, sea sickness.	Antispasmodic, sudorific, bronchodilator, intoxicant.
42.	*Nicotiana rustica* Linn.	N. Hijaz	Alkaloid, nicotine, oil, resin, fat, gum.	Tetanus, strychnine poisoning, rheumatic swellings, syphlitic nodes, skin diseases, nasal polyp. ch. giddiness and fainting.	Antispasmodic, sedative, emetic, anodyne.
43.	*Solanum nigrum* Linn.	N. and S. Hijaz, E. Najd, N.S. and E. Regions.	Alkaloids, glucoside, resins, fat, volatile oil and Vit. C.	Dropsy, jaundice, ch. enlargement of liver, fever, anthrax, pustules, burns, herpex, rheumatic joints, gonorrhoea, and heart disease.	Expectorant, sedative, diaphoretic, cathartic, hydragogue, anodyne, alterative, diuretic, cardiac tonic.
44.	*Withania somnifera* (L) Dun. in. DC	N. and S. Hijaz, E. Najd, S. E. Regions.	Alkaloids, volatile oil, fatty acids, tannins and Vit. C.	General debility, rheumatism, dyspepsia, anorexia, cough and dropsy.	Tonic, stimulant, alterative, aphrodisiac, narcotic, diuretic, abortifacient.
45.	TAMARICACEAE *Tamarix aphylla* (L) Karst.	N. and S. Hijaz, E. Najd, E.N. & S. Regions.	Tannins.	Sexual debility, eczema capitis.	Astringent, tonic, aphrodisiac.
46.	TILIACEAE *Corchorus olitorius*. Linn.	South Hijaz.	Glucosides and saponins.	Ch. cystitis, gonorrhoea, dysuria, fevers.	Demulcent, tonic, diuretic, febrifuge.
47.	*Corchorus trilocularis* Linn.	South Hijaz.	Glycoside, oil	Fever, obstruction of abdominal viscera.	Demulcent, febrifuge.

table 1 contd...

Sl. No	Family and Name of species.	Geographical and Ecological Distribution.	Chemical Constituents.	Medicinal uses.	Pharmacological properties.
48.	UMBELLIFERAE *Apium graveolens* Linn.	Najd	Glucoside, volatile oil	Asthma, bronchitis, liver and spleen disorders, colic, dropsy, lumbago, rheumatism, sexual debility.	Aphrodisiac, stomachic, diuretic, carminative, tonic, astringent, cordial, laxative, appetiser, stimulant, emmanagogue, abortifacient, antispasmodic.
49.	*Coriandrum sativum.* Linn.	N. Hijaz, Najd and E. Region.	Volatile oil	Dyspepsia, flatulence, vomiting, flatulent colic	Stimulant, aromatic, carminative.
50.	ZYGOPHYLLACEAE *Peganum harmala* Linn.	N. Hijaz, E. Najd N. and E. Regions.	Alkaloids, resins.	Tapeworms, fevers, asthma, colic, jaundice, amenorrhoea.	Narcotic, anodyne, emetic, emmanagogue.

TABLE 2

PHYTOCHEMICAL AND BIOLOGICAL SCREENING OF SOME SAUDI MEDICINAL PLANTS

Botanical Source	Part Tested	Chemical Constituents.	Cardiovascular Effects		Behavioural Effects			Skeletal Muscle	Smooth Muscle	Antimicrobial Activity Against	Biochemical and Haematological Activity.
			Heart	B.P.	CNS ST/DP	RESP.	TEMP.				
Alhagi maurorum Medic.	A P	FD, TN, SL/TP, SN, AQ	FCI	TF	ST	RR	NC	NC	NC		
Artemisia herba-alba Asso.	WP	AL, FD, TN, SL/TP, VO, AQ	FCD	TF	ST	RR	NC	AAC	NC	*B. subtilis*	
Calatropis procera (Ait) Ait. F.	AP	AL, CG, FD, TN, SL/TP, SN	FCI	TF	ST	RR	NC	AAC	C	-	Hyperkalaemia.
Cressa cretica Linn.	WP	AL, FD, TN, SL/TP, CN	NC	TF	DP	RS	HT	AAC	AAC	-	-
Heliotropium europaeum	WP	AL, FD, TN, SL/TP, VB, VO.	NC	TF	NC	NC	NC	AAC	C	*B. subtilis*	-
Marrubium vulgare Linn.	WP	CG, FD, SL/TP	NC	TF	DP	RS	HT	AAC	C	-	Hypocholesterolemia.
Peganum harmala Linn.	AP	AL, FD, TN, VB, SL/TP.	FCD	TF	ST	RS	HT	PAC	AAC	-	Hyperglycaemia
Periploca aphylla Decne.	AP	AL, CG. FD, TN, SL/TP, SN	FCD	TF	DP	RS	HT	AAC	C	-	-
Tamarix aphylla (L) Karst.	A P	AL, CG, FD, TN, SL/TP, SN	FCD	TR	ST	RR	NC	PAC	C	*Pr. vulgaris.*	-
Thymus vulgaris Linn.	WP	FD, TN, SL/TP, VO, AQ, CNG	NC	TF	NC	RS	NC	AAC	NC	*S. aureus.* *Pr. vulgaris* *C. albicans* *B. subtilis*	-

ABBREVIATIONS

WP = Whole plant; AP = Aerial parts; VO = volatile oil; VB = Volatile base; AL = Alkaloids; CG = Cardiac glycosides; AQ = Anthraquinones.
FD = Flavonoids; SN = Saponins; CN = Coumarins; SL/TP = Sterols/triterpenses; TN = Tannins; GC = Glucosinolates; FCI = Force of contraction increased; FCD = Force of contraction decreased; RR = Rapid respiration; RS = Slow respiration; NC = No change; TF = Transient fall in BP; TR = Trasient rise in BP; HT = Hypothermia; AAC = Antagonise acetylcholine; AH = Antagonise histamine; SR = Significant rise in B.P.
C = Contractions; ST = Stimulation; DP = Depression; PAC = Potentiation of acetylcholine induced contractions; BAT = Contraction blocked by atropine; BAH = Contractions blocked by anti-histamine; PH = Potentiation of histamine induced contraction; BGM = Blocked by gallamine.

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A SURVEY OF RESEARCHES ON THE ACTIVE PRINCIPLES OF TURKISH MEDICAL PLANTS

Dr. Erendiz Atasu and Dr. Filiz Ilisulu

TURKEY

A SURVEY OF RESEARCHES ON THE ACTIVE PRINCIPLES OF TURKISH MEDICAL PLANTS*

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TURKEY

There are about 186 genera of medicinal plants growing in Turkey. Since 1930s numerous plants have been subjected to research concerning their chemical constitution.

A survey of such publications indicates that medicinal plants have been the interest of pharmacists mainly; most of the researches having been carried out in the research laboratories of the pharmacy faculties in Turkey; whereas research groups consisting of chemists, agriculturists have also paid great attention to medicinal plants and contributed vastly to the elucidation of plant chemistry in Turkey. Whatever degree he has, the researcher in plant Chemistry has almost always been a member of the university staff. The medicinal industry has not been much interested in medicinal plants up to now.

Although the researches have been realised in the universities and not in various centers, it is not possible to say that such work has been carried out according to a central plan and programme; on the contrary, the plants have been selected rather at random. But in spite of this, so to speak wide-spread nature of the selection of research material, one can detect three distinct aims of the researcher. The first is to determine the chemical constitution of Turkish medicinal plants, which remained unknown until 1950s or even 1960s. The second aim is to testify the verity of the activity of plants used in folk medicine; and the third is to determine whether the Turkish botanical species may be substituted for the species stated in pharmacopeias and codices.

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Probably, the first aim caused the researcher's inclination to all kinds of medicinal plants, those containing alkaloids, glycosides, volatile oils, phenolics, steroids, etc. Plants consisted a vast and unknown field for the researcher.

The second and third aims, restricted this field, more or less to the pharmacist, as it is natural for the pharmacist to be involved in the scientification of folk medicine and also of Turkish botanical species. Isolation of completely new chemical compounds, and discovering completely new plants with pharmacological activity has not been the major aim of the Turkish researcher until recently.

Thus more than 120 genera and 280 species containing alkaloids, glycosides, carbohydrates, volatile oils, flavonoids and phenolics, steroids, lipids, triterpenoids, etc., have been analysed. About 30% of these publications date before 1970s and consist mainly of qualitative and quantitative determination of the constituents by classical reactions and chromatographic methods. Since 1970s, researchers have tried to overcome the financial difficulties in obtaining modern apparatus and have tried to utilise the modern methods which have developed incredibly during the last 15 years. Table1 gives an idea about the distribution of work done on medicinal plants from the point of view of the active principles. Table 2 covers a great majority of the genera worked up with.

Publications have numerically increased since 1970s and consist not only of determination but also of isolation, purification and structure elucidation of the active principles.

Plants carrying alkaloids, volatile oils and flavonoids always have had the prominence. The first doctorate thesis prepared by a Turkish pharmacist[16] dated back to 1932 and was on *Papaver somniferum*, the most important alkaloid plant in Turkey. Lately work has concentrated on thebein yielding Papaver species such as *P. fugax*, *P. bracteatum*, etc.[17-25].

Species like *Digitalis ferruginea, D. lanata* among glycoside bearing plants have been examined for determining whether they are equivalent to the officinal species or not.

Most of the Turkish Labiatae plants carrying volatile oils have been analysed by GLC since 1970s, and those species which can be substituted instead of the official plants, and those with economic value have been determined.

Again recently, completely new alkaloids[10,26,27] and flavonoids[85,94,95] have been isolated and described. There are also publications indicating for the first time, the occurrence of compounds previously not known to occur in certain genera[77,104], and also publications on structure elucidation of compounds with doubtful chemical structure[151].

Lately plant extracts are being scanned for various pharmacological activities, such as antiglycemic, antibiotic, antifungal, antilipemic and specially for antitumour properties. A research group[165] has scanned about hundred Turkish plants for neoplastic activity and found five of them very promising.

More promising results are to be expected, when research groups can establish better collaboration among one another.

Table I

Constituents	Number of plants		Number of publications	Number of publications before 1970s
	Genera	Species		
Alkaloid bearing plants	24	70	36	9
Volatile oil bearing plants	24	82	37	12
Flavonoids, Phenolics bearing plants	25	54	34	3
Glucoside, Carbohydrate bearing plants	20	55	34	16
Steroid, lipid, triterpernoid bearing plants	25	26	27	5

Table 2

Active principles	Family	Genera
Alkaloids	Berberidaceae	Epimedium (2), Berberis (1)
	Boraginaceae	Symphytum (3, 4)
	Cannabinaceae	Cannabis (5)
	Compositae	Achillea (6)
	Cucurbitaceae	Ecballium (7)
	Dioscoreaceae	Tamus (7)
	Ephedraceae	Ephedra (8,9)
	Leguminosae	Genista (10)
	Liliaceae	Merendera (11) Colchicum (12)
	Papaveraceae	Glaucium (14, 15) Corydalis (13), Papaver (16, 17-25), Fumaria (26))
	Ranunculaceae	Aconitum (27, 18), Delphinium (29)), Thalictrum (30,31))
	Solanaceae	Nicotiana (32), Hyoscyamus (33,34,35) Mandragora (7,35), Datura (35), Atropa (35)
	Zygophyllaeae	Peganum (36)
Volatile oils	Cannabinaceae	Humulus (37)
	Compositae	Achillea (6), Artemisia (38, 39, 40, 41) Pyrethrum (42), Santolina (43)
	Cupressaceae	Juniperus (44,45), Thuja (46)
	Geraniaceae	Pelargonium (47)
	Graminae	Cymbopogon (48)
	Labiatae	Lavandula (49), Mentha (50, 51, 52, 53) ,Origanum (43, 54, 55), Salvia (56, 57, 58, 59), Satureia (60), Sideritis (60), Teucrium (43), Thymbra (61, 62), Thymus (63, 64), Ziziphora (43, 65)
	Lauraceae	Laurus (43)
	Myrtaceae	Eucalyptus (66, 67)
	Rosaceae	Orthurus (69)
	Rutaceae	Ruta (70)
	Tiliaceae	Tilia (71)
	Umbelliferae	Echinophora (72)
	Pinaceae	Abies (68)

Table 2

Active principles	Family	Genera
Flavonoids, Phenolics	Berberidaceae	Berberis (73)
	Compositae	Achillea (74), Chrysanthemum (76), Gnaphalium (77), Helychrysum (78-84), Matricaria (86), Inula (85), Notobasis (87), Silybum (88,89), Antennaria (75)
	Euphorbiaceae	Euphorbia (90, 91)
	Geraniaceae	Pelargonium (92)
	Hypericaceae	Hypericum (93)
	Labiatae	Salvia (94, 95) ,Thymus (96)
	Leguminosae	Glycyrrhiza (97), Genista (98)
	Liliaceae	Asphodeline (99)
	Polypodiaceae	Dryopteris (100, 101)
	Rosaceae	Crataegus (102)
	Rutaceae	Ruta (103)
	Scrophulariaceae	Digitalis (104), Verbascun (105)
	Umbelliferae	Smyrnium (106)
Glycosides and carbo-hydrates	Asclepediaceae	Marsdenia (107)
	Caryophyllaceae	Saponaria (108)
	Equisetaceae	Equisetum (109)
	Labiatae	Salvia (110)
	Leguminosae	Glycyrrhiza (97, 111) Astragalus (112), Ceratonia (113, 114)
	Liliaceae	Urginea (115), Smilax (116)
	Orchidaceae	Orchys (117), Ophyris (117), Serapias (117) Himanto-glossum (117), Anacamptis (117)
	Polygalaceae	Polygala (118)
	Primulaceae	Primula (119), Cyclamen (120, 121)
	Ranunculaceae	Helleborus (122, 123, 124), Adonis (125)
	Rhamnaceae	Rhamnus (126, 127)
	Rubiaceae	Cruciata (128)
	Scrophulariaceae	Digitalis (129-135)
	Strycaceae	Styrax (136)
	Umbelliferae	Ferula (138, 139), Ammi (137), Smyrnium (140)

Table 2

Active principles	Family	Genera
Steroids, lipids, triterpenoids and others	Anacardiaceae	Pistacia (141)
	Celastraceae	Evonynus (143)
	Compositae	Gundelia (144), Achillea (74), Cnicus (145), Inula (146)
	Cruciferae	Boreava (147), Eruca (142)
	Cucurbitaceae	Cucumis (148)
	Euphorbiaceae	Ricinus (149)
	Hamamelidaceae	Liquidambar (150, 151)
	Labiatae	Sideritis (152), Salvia (110, 153)
	Liliaceae	Merendera (154)
	Myrtaceae	Myrtus (155)
	Phaeophyceae	Sargassum (156), Phyllophora (157)
	Punicaceae	: Punica (158)
	Ranunculaceae	Paeonia (159), Clematis (160)
	Rosaceae	Crataegus (102)
	Scrophulariaceae	Digitalis (161)
	Solanaceae	Withania (162)
	Styracoceae	Styrax (163)
	Umbelliferae	Smyrnium (110, 164)

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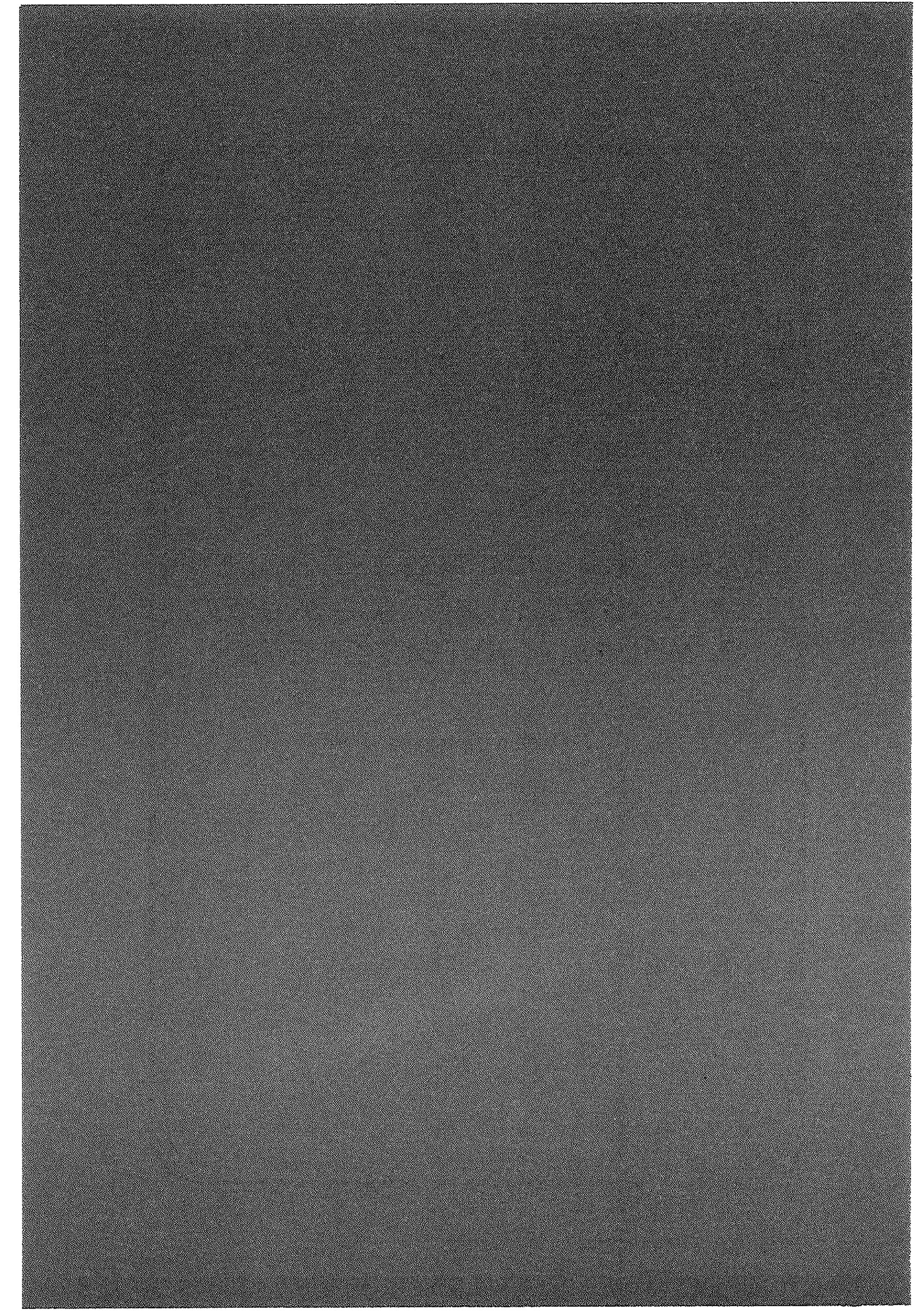
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OBSERVATIONS ON THE ROLE OF CLASSICAL METHODOLOGY IN MODERN PHYTOCHEMISTRY

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OBSERVATIONS ON THE ROLE OF CLASSICAL METHODOLOGY IN MODERN PHYTOCHEMISTRY*

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At the first Kuwait International Conference on Islamic Tibb, held in January 1981, I had offered some observations on the progress of medicine in its historical context, and imperatives of the regeneration of Tibb in modern times. In the course of my presentation, I had in the light of Avicenna's analytical approach to the theoretical and practical aspects of Tibb, pointed out its basic commitment to an expressly scientific attitude. With reference to this position, I further stated that in the different fields of exact and semi-exact sciences there can be one and only one systematised body of knowledge at any given time, and that in the progress of Tibb it is essential to aim at its integration with the new knowledge provided by these scientific disciplines.

Leading on from there, my paper on the present occasion deals with the role of classical methodology in modern phytochemistry. In this connection, we first of all, have to take into account the fact, that medicinal plants had formed the main base for the treatment and prevention of various human ailments in the eastern as well as western system of medicine, till about the turn of the century. However, the subsequent phenomenal successes with the development of chemo-therapy, the role and study of drugs of plant origin suffered a great setback and it is only during the last few decades that there has been a gradual recovery of interest in the medicinal flora.

This recovery of interest in the field of medicinal plants was

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particularly stimulated by the acceptance in the medical world of the therapeutic virtues of the alkaloids of *Rauwolfia serpentina* in the treatment of hypertension, mental ailments and cardiac arrhythmias of various origins. In more recent years the discovery of the alkaloids of *Vinca rosea*, namely vinblastine and vincristine, in the treatment of certain forms of cancer, has provided further support to the importance of multi-disciplinary studies in the therapeutic constituents of medicinal plants.

An important factor in the promotion of this sphere of studies relates to the emergence of new techniques like paper and column chromatography, electrophoresis, counter-current distribution and vapour phase chromatography, as a result of which the isolation of uniform substances from the usually intractable complex of closely allied physiologically active constituents, has become relatively a simple matter, compared with the old orthodox procedures employed during the earlier days of my work on medicinal plants. On the other hand, the advent of electronic appliances like U.V., computerized mass spectrometers and N.M.R. have revolutionized the scope and pattern of structural studies in chemical constituents.

However, without in any way wanting to minimise the importance of these techniques and facilities, particularly in the field of studies relating to correlation of structure and activity, I find that the classical procedures continue to have an important place in the isolation of plant constituents and the experimental management of chemical reactions.

In illustration of the points I have made out, I would first of all refer to the vital importance of handling fresh undried plant material for studies in their constituents, in order to avoid structural changes which are likely to occur in them through aerial oxidation and enzymatic action in the process of drying and storage. Little attention has been given to this factor, apparently due to the fact that most of the phytochemical studies have been carried out in the western countries

where fresh drug materials of tropical and humid tropical regions were not available.

By way of an outstanding example on the basis of my own earlier work, I would cite the case of the young sprouts of *Cicer arietinum* Linn. (Bengal gram; chana). On working up the fresh undried, uncrushed material, it was possible to isolate from its alcoholic extract two isoflavones and an amino acid, named as Biochanins A, B, and C. While one of the isoflavones was later identified with formonenetin, Biochanin A was established as a new product through degradative studies followed by synthesis. In contrast to this, not even a trace of the crystalline constituents could be obtained from the sprouts after drying them in shade. Much the same, though not quite such a drastic situation could be recorded in respect of work on *Rauwolfia* and *Holarrhena* alkaloids. More recently the validity of this approach has been exemplified in our studies in the fresh fruits of *Melia azadirachta* and Garlic cloves. I have specifically referred to these observations, because a reinvestigation of many plant materials, observing this procedure, holds out both an opportunity and a challenge for the scientists working in our region.

The second aspect of the subject matter presented here is concerned with the general neglect of classical procedures prior to the application of modern analytical devices to which I have referred for the isolation of uniform constituents. The former methods are primarily based on exploiting the varying character of the basic, acidic and neutral components of plant extracts in respect of their solubilities, basic or acidic strength, and often widely varying solubilities of the salts of organic bases and acids. It may perhaps surprise many of my colleagues here that right from my earlier work in the '30s on alkaloids, triterpenoids and flavonoids and other plant constituents, down to the present day, a host of new substances have been isolated without recourse to chromatographic and other mechanical operations. One of the greatest advantages of the

classical method of isolation and reaction management consists in the fact that once a method has been ultimately worked out large quantities of products can be obtained with comparative ease, affording the possibility to comprehensive pharmacological studies, and also investigations of structure and activity relationship, based on their derivations. It is true that with the modern facilities for structure elucidation substances in milligram quantities are suffice for it, but they are by far not enough to undertake the work to which I have referred.

SOME APPROACHES TO THE STUDY OF INDIGENOUS MEDICINAL PLANTS

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SOME APPROACHES TO THE STUDY OF INDIGENOUS MEDICINAL PLANTS*

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The bulk of the populations of the Afro-Asian countries, particularly those living in villages, rely on the indigenous medical systems to provide relief from disease. Systematic scientific investigations, particularly during the current century, have resulted in the identification of a growing number of active constituents many of which are now routinely used in modern medicine. These include reserpine for the treatment of cardiac arrhythmias, vincamine as a vasodilator, and vinblastine and vincristine as antitumor agents etc. Isolation and structural studies have accordingly been directed in many laboratories around the world aimed at isolating new natural products which could prove to be valuable chemotherapeutic agents.

In order to derive a logical appreciation of the role that traditional medicines, particularly herbal prescriptions, play in alleviating disease, it is important to attempt to understand the mechanism by which life functions at the molecular level. Living organisms exhibit a highly complex panorama or remarkably intricate and beatifully organised chemical reactions which can be studied in unambiguous quantized terms. While philosophers may ponder and argue over the correctness of considering man as a summation of his molecular compounds, the study of life is made more amenable to an analytical study if it is considered in terms of its interacting compounds, at atomic, molecular or higher levels of organisation.

When one examines life at the molcular level one finds that

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literally millions of different chemical reactions are occurring in the human body. Most of these reversible reactions are under strict enzymic control, and the point of equilibrium in each of these reactions is determined by a large number of variable factors such as pH of the surrounding medium, concentration of interacting molecules etc. Thus in each person, the point of equilibrium of these reaction will vary. The overall summation of these equilibria will therefore result in a differing biological spectrum and hence make each individual uniquely different from any other although certain broad categorisations may be made. The concept to temperament or '*Mezaj*' can thus be rationalised.

It is apparent that the enormous complexity of the biological system does not lend itself readily to a scientific analysis of all that occurs within it. This is one reason why modern medicine has concentrated attention on the use of individual chemotherapeutic principles rather than complex mixtures. The precise metabolic pathways of individual substances administered to living systems can be monitored with greater ease by radio-isotope tracer techniques, allowing a degree of rationalisation of the mechanisms by which the drugs interact.

In the case of the herbal preparations, literally thousands of different chemical substances may be present and it is impossible even with the highly sophisticated scientific tools available today, to determine how each component in the herbal mixture is acting on the body. Herbal preparations, even with demonstrated biological activity, have therefore generally been ignored in western medicine.

Furthermore, in spite of the fact that herbal remedies have been used safely since centuries for obtaining relief from various ailments, the prevailing laws in the west do not allow clinical trials of such plants preparations on human beings. This means that even where toxicological and pharmacological studies have demonstrated that

a particular herbal preparation is safe and active, it usually cannot be legally incorporated into the existing pharmacopoeia.

This state of affairs does not exist in most Afro-Asian countries, which places them in a position of great advantage. As herbal preparations have been used safely over the centuries, the risk involved in undertaking direct clinical trials is minimal and this can be further reduced by preliminary toxicological studies. The advisability of undertaking direct clinical trials of herbal prescriptions has been a matter of some considerable discussion in international forums in recent years, and the concensus of opinion by the World Health Organisation and other international bodies such as U.N.I.D.O. has been that animal experiments should follow and not precede clinical trials with those herbal remedies whose safety and efficacy has been established in the traditional system of medicine. Thus the World Health Organisation, at a meeting on the "Promotion and Development of Traditional Medicine" held in Geneva from 23rd November to 2nd December 1977 has resolved that: Clinical research is necessary for drug trials and validation; it is better organised in association with hospital or treatment centres. Drug trials on animals should be an extension of these studies. It needs to be emphasised that the biological properties of certain medicinal plants should first be tested with the preparations used by traditional healers. The effectiveness of some drugs could be lost when chemical priniples are extracted from the crude drugs and then tested. This procedure is mandatory for the screening and verification of drugs derived from traditional medicinal plants. A similar resolution, advocating direct clinical trials, was adopted at the U.N.I.D.O. Technical Consultants Meeting held in Lucknow, India in March 1978.

For a scientific approach to the study of established herbal remedies it is imperative to establish research institutes of an international level of excellence with all the necessary facilities by way of sophisticated instrumentation, books and journals and highly

qualified manpower. These institutes would necessarily have to be multi-disciplinary in character incorporating departments of clinical pharmacological, toxicology, microbiology, virology, biochemistry and phytochemistry. The researches should begin by clinical trials with those herbal prescriptions which are reputed to be effective in diseases which are amenable to quantized analysis. The body of statistical data which would accumulate would then speak for itself regarding the efficacy or otherwise of the drug being tested. In cases where definite biological activity is observed, detailed toxicological evaluations would need to be carried out to establish the safety of the drug in various classes of patients e.g. children, pregnant women etc. Drugs passing these toxicological trials can then be incorporated in an integrated pharmacopoeia, and detailed studies regarding the mode of action of the drug, nature of active constituents etc. can follow.

It is vitally important to appreciate, that the development of new drugs for different disease is a formidable and expensive proposition even to the huge research organisations of the multi-billion dollar pharmaceutical companies. Several thousand compounds have to be synthesised before one promising candidate suitable for clinical trials can be made available, and this also usually falls by the wayside once the detailed clinical and toxicological data are collected.

According to a report published by the U.S. drug industry, a sum of 722.4 million U.S. dollars were spent in 1974 alone on company financed research and development, and only 19 new drugs were introduced in the market during that year in the United States. This would imply that an expenditure of some 38 million U.S. dollars is involved in the form of research and development costs before a single new drug is introduced into the international market! The legacy of the indigenous medical systems thus offers an extremely cheap and viable alternative for treatment in the Islamic countries. The search for "active single ingredients" on the other hand is a very expensive proposition and requires a very high order of scientific expertise and basic institutional infra-structure such as high level institutes of

chemistry, biochemistry, general and clinical pharmacology etc. If the efficacy of individual herbal preparations in specific diseases can be scientifically established by means of comprehensive pharmacological and clinical trials, and toxicological data is satisfactory, then there is no reason why herbal extracts should not be incorporated into an integrated pharmacopoeia.

It would be appropriate to mention some of the researches being carried out by our group on the isolation and structure elucidation of the chemical constituents of plants which find use in the indigenous medical system. One plant chosen for such a study is *Berberis aristata.*

Berberis aristata DC (Berberidaceae) is shrub found in the northern mountainous regions of Pakistan and in the Nilgiri Hills of Southern India. The extracts, made from the root bark, are known as "*rasaut*" and are used in the traditional system of medicine for the treatment of jaundice and skin diseases. As a result of careful isolation studies, two new alkaloids, "Karachine"[1] and "Taxilamine"[2] have recently been isolated.[2,3] Karachine is the first naturally occurring berbinoid of this skeletal system and is the most complex of more than 50 protoberberine alkaloids presently known. Its structure has been elucidated largely on the basis of its high resolution mass of 360 MHz (FT) NMR spectra, and the positioning of groups confirmed by Nuclear Overhauser Effect studies.

Taxilamine[2] is the fourth member of a class of pseudobenzyliso - quinoline alkaloids. The other three members of this class are polycarpine[3] found in *Enantia polycarpa* Engl. and Diels (Annonaceae), rugosinone[4] obtained from *Thalictrum rugosum* Ait (Ranunculaceae) and (-) - ledecorine[5] present in *Corydyalis ledebouriana* K.et.K (Fumariaceae). Its structure has been elucidated on the basis of a 360 MHz NMR and high resolution mass spectral studies.

(3) (4) (5)

Another plant under study is *Rhazya stricta* Decaisne (Apocyanaceae). This is a small glabrous erect shrub which grows profusely in the North-Western region of Indo-Pakistan sub-continent. The leaves of this plant are used by the traditional practitioners as a bitter tonic for sore throat, in fever, in general debility and as a curative for chronic rheumatism. The fruits and leaves are considered efficacious in cases of boils and eruptions. As a result of isolation and structural studies carried out by us a number of new alkaloids have been isolated from its leaves and their structures elucidated[4, 5]. These are strictalamine[6], rhazimal[7], rhazinol[8] and rhazimol[9]. Pharmacological studies are underway to determine the biological activity of these new alkaloids.

(6) (7) (8) (9)

Another interesting plant chosen for a detailed phytochemical study is *Fagonia indica* linn. This is a small spiny undershrub which is widely distributed in Pakistan. Locally known as "*sachi booti*" or "*dhamasa*", an aqueous decoction of the leaves and young twigs is a popular remdey for the treatment of various skin lesions. The plant is claimed to be a remedy for cancer in its early stages. A new sapogenin[10] "Nahagenin" has been isolated from the hydrolysed extracts of the aerial parts of the plant, and its structure has been elucidated on the basis of a 400 MHz PMR spectrum, a 100 MHz CMR spectrum, and high resolution mass spectrum[6]. The structure[10] has been confirmed by an X-ray crystal structure determination.

(10)

Betula utilis, locally known as "*Bhojpatter*" is a tree commonly found at high altitudes in the temperate Himalayas extending from Chitral, eastwards to Azad Kashmir, and in Sikkim and Bhutan. The

infusion of its bark has found wide use in indigenous medicine as an antiseptic, carminative and in hysteria. Our interest in the systematic investigation of the chemical constituents of Pakistani medicinal plants has led us to a chemical investigation of the bark of *Betula utilis*. This has resulted in the isolation of a new triterpenoid, "Karachic acid[11]", the structure of which has been solved on the basis of chemical and spectroscopic studies.

The isolation of a number of cucurbitacins with cytotoxic properties promoted us to investigate the active principles present in the fruits of *Cucumis prophetarum* (Cucurbitaceae), a plant locally known as "*Choti indrayan*" or "*Khar indrayan*". It is a perennial trailing herb with ellipsoidal echinate fruits. The plant grows wild in various regions of Pakistan, Rajputana (India), Saudi Arabia and tropical Africa. The fruit is used in indigenous medicine as an emetic and purgative. It is known to contain cucurbitacins B and D and traces of cucurbitacins G and H.

As a result of isolation studies carried out on the fruits of this plant, we have isolated a new cucubitacin, Cucurbitacin Q-1[12] which closely resembles Cucurbitacins O and P in its structure[8]. The cytotoxicity of these cucurbitacins against Eagles KB strain of human carcinoma of the nasopharynx has been demonstrated, and it has been shown that the side chain double bond and tertiary acetate are essential for cytotoxic activity. The activity of cucurbitacin Q-1 would

therefore be of interest, and it is being studied by the National Institute of Health, Bethesda, U.S.A.

Siddiqui and co-workers had previously reported a new triterpenoid, "Loranthol" from the berries of *Loranthus grewinkii*, a parasite found widely distributed on pear, apricot and almond trees. The gum from these berries is widely used in the indigenous system of medicine as a general tonic, relaxant and laxative. This triterpenoid has been re-isolated and its structure has been elucidated on the basis of chemical and spectroscopic studies to be (13)[9].

Lastly mention may be made of our work on the anti-tumor alkaloids of *Catharanthus roseus*. This plant is locally known as "*Sada bahar*", and has been used in various indigenous medical systems for the treatment of diabetes. As a result of isolation studies, two highly active anti-cancer alkaloids have been isolated by Canadian and

American workers. Known as vinblastine and vincristine, these drugs are used in medicine for the treatment of Hodgkins disease, choriocarcinoma, acute leukaemia in children and other solid tumors. Their trace occurrence in the leaves of *C.roseus* however raises their price to several thousand dollars per gram, and poses a serious problem to the pharmaceutical industry.

As a result of efforts exerted over the last 15 years, we have succeeded in developing two different synthesis of these drugs which have been published[10-16] and internationally patented. Efforts are now underway to scale up the laboratory work to a pilot plant level. A farm has been grown in the Karachi University Campus, and a pilot plant for concentration of plant extracts has been installed in the Institute. The synthetic approaches are expected to make these drugs very cheaply available, and have opened the way to a whole series of new anti-tumor drugs.

The work carried out by us on the 7 indigenous medicinal plants cited above is illustrative of many other similar systematic phytochemical studies underway in our laboratories. The necessity of establishing regional centres of general and clinical pharmacology, to study the biological activity of such plants and the natural products isolated therefrom, cannot be over-emphasied.

In summary, traditional medications offer an area of research activities which places the Afro-Asian countries in a position of decided advantage over the West on account of the restrictive legislature in America and Europe, and the obsession of Western medicine to look for single active ingredients. Medications in which there is no single active substance but the biological activity is due to synergistic and detoxifying action of a large number of compounds, cannot be easily adopted by "modern medicine" for the treatment of various disease. The future and prospects of "Islamic Medicine" depend on the speed and efficiency with which research programmes on the lines indicated above can be launched.

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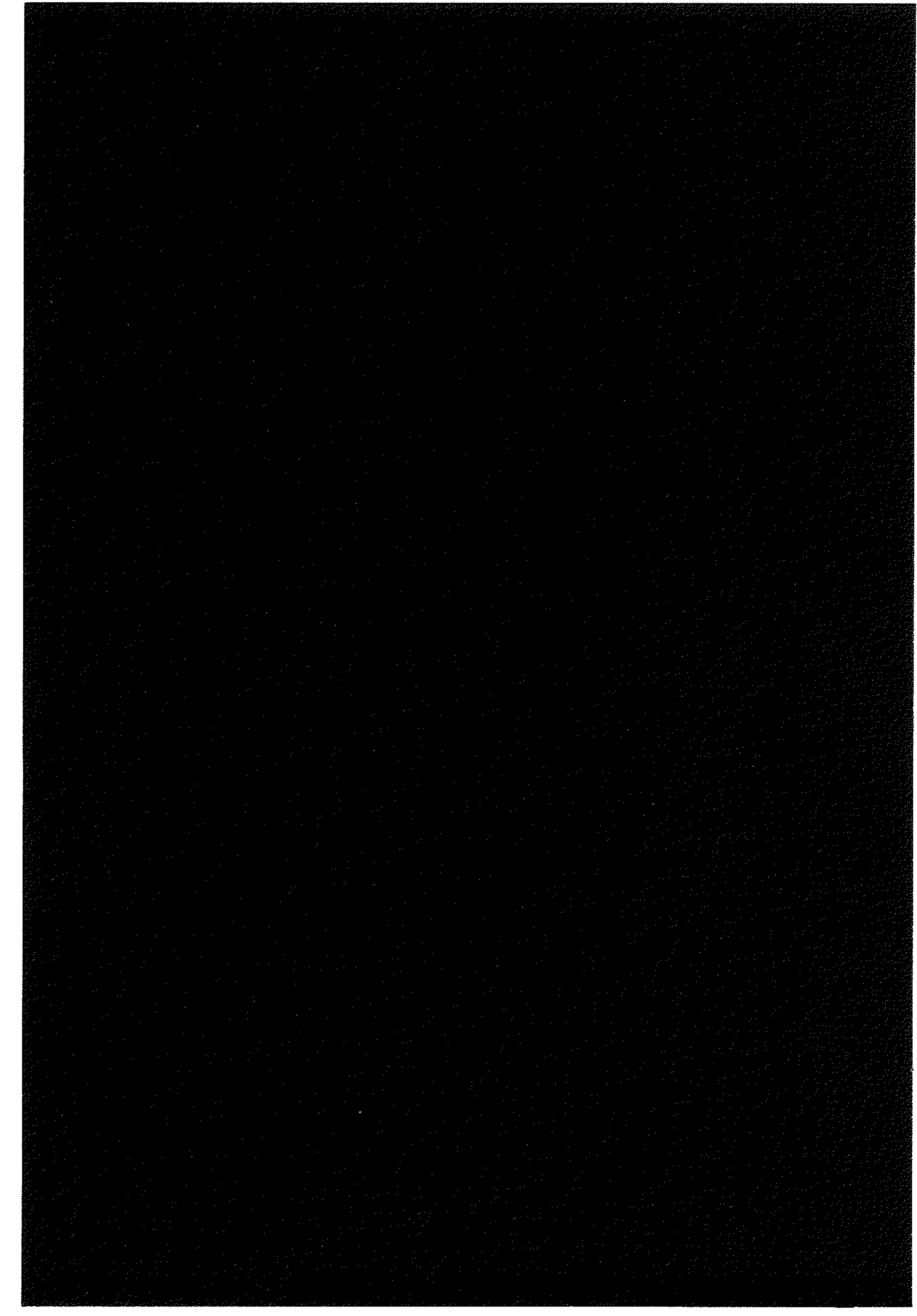
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THE ISLAMIC CONTRIBUTION TO THE KNOWLEDGE OF OPIUM AND PAPAVER SPECIES

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THE ISLAMIC CONTRIBUTION TO THE KNOWLEDGE OF OPIUM AND PAPAVER SPECIES*

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Opium poppy is a well known medicinal plant cultivated in Central Anatolia since a time as nearly as the Hittites period (B.C. 2000). Let us notice the similarity present between the word "Hassika", which is the Hittite name for opium poppy, and the word "Hashas", the Turkish name used today for the same plant. As meaning, it is closely related with the Hittite words corresponding to "to sleep" and "to be calmed"[1].

Dioscorides (first century A.D.) gives us information about the poppy species used in medicine, the collection of the opium and its analgesic and narcotic properties. All that he mentions is in fact very close to what we know today about it.[2]

The same information is more or less repeated in Ibn el-Beithar's treatise, written about twelve centuries after Dioscorides.[3] The monographs written in the following years bring nothing specially new about this drug.[4]

The first chemical investigations on Anatolian opium were made between 1864-1867 by Faik Pascha. He detected a great variation of morphine contents (2.1 to 21.3%) in this drug, when he examined many specimens collected from different opium producing regions[5,6]. He concluded that these differences were due to the degree of adulteration then applied.

In Turkey, the first research on opium poppy was made by Hüsnü

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Sarim (Çelebioglu) in Berlin University, where he investigated the development of laticiferous vessel in the young plant[7].

Investigations on the alkaloids of wild Papaver species began in 1967. Shargi and Lalezari detected a high amount of thebaine in a *P. bracteatum* sample growing in Iran[8]. Thebaine has no narcotic or analgesic effect but can easily be converted into codeine. This alkaloid and the species containing it have therefore gained importance and more emphasis is given to investigations on *P. bracteatum*.

Investigations on the alkaloids of Turkish wild Papaver species have shown that *P.bracteatum* growing in Munzur Mountains is rich in thebaine[9,10]. Later other species such as *P. cylindricum, P. fugax* and *P. triniifolium* collected from Eastern Turkey have been found to contain the same alkaloid. Among these species, *P. fugax* is reported to contain the highest quantity of thebaine[11,14]. Besides thebaine, some other alkaloids of medicinal importance like papaverine and narcotine have also been isolated from these species.

Some new alkaloids have been obtained from wild Papaver species of Turkish origin. Two new alkaloids of the benzyltetrahydroisoquinoline type were isolated from *P. pseudo-orientale* growing in Sivas Yildizdag, which we named as macrantaline and macrantoridine[15]. From *P. pilosum* and *P. apokrinomenon* two new alkaloids which were named as amurinine and epiamurinine have been isolated[16]. I-methoxyallocryptopine has been obtained from *P. curviscapum* as a natural product[17].

Studies on the alkaloids of Papaver species of the sections Macrantha and Miltantha have shown the existence of many chemical strains in Turkey[14,18,19]. For example, there are 5 chemical strains in *P. fugax*, 2 in *P. armeniacum*, 2 in *P. triniifolium* and 4 in *P. tauricola*.

A high amount of narcotine has recently been obtained from *P. rhopalothece* which is an annual Papaver species and grows only in Western Anatolia. It is observed that people use this plant as an

antitussive. It is very likely that its sedative effect is due to this compound[20].

Investigations on the alkaloids of the section Pilosa have revealed the high yield of glaucine in Papaver species which is also well known for its antitussive property[21].

Systematic studies on annual Papaver species of Turkey have recently been made by A. Baytop and co-workers and the chromosome numbers of some of them are given[22].

Wassel, the Egyptian scientist worked on rapid changes of the major alkaloids of *P. somniferum* during the development of the fruit[23]. El-Masry and co-workers have also reported the existence of N-methylasimilobine as a major alkaloid in *P. rhoeas* growing in Egypt[24].

The Iranian scientists have isolated a new alkaloid of tetrahydroprotoberberine type from *P. pseudo-orientale*, which they named as aryapavine[25].

Alkaloids of Iraqi origin of some Papaver species have been studied and some of them like *P. persicum* (syn: *P. tauricola*) and *P. glaucum* are found to have chemical strains[26].

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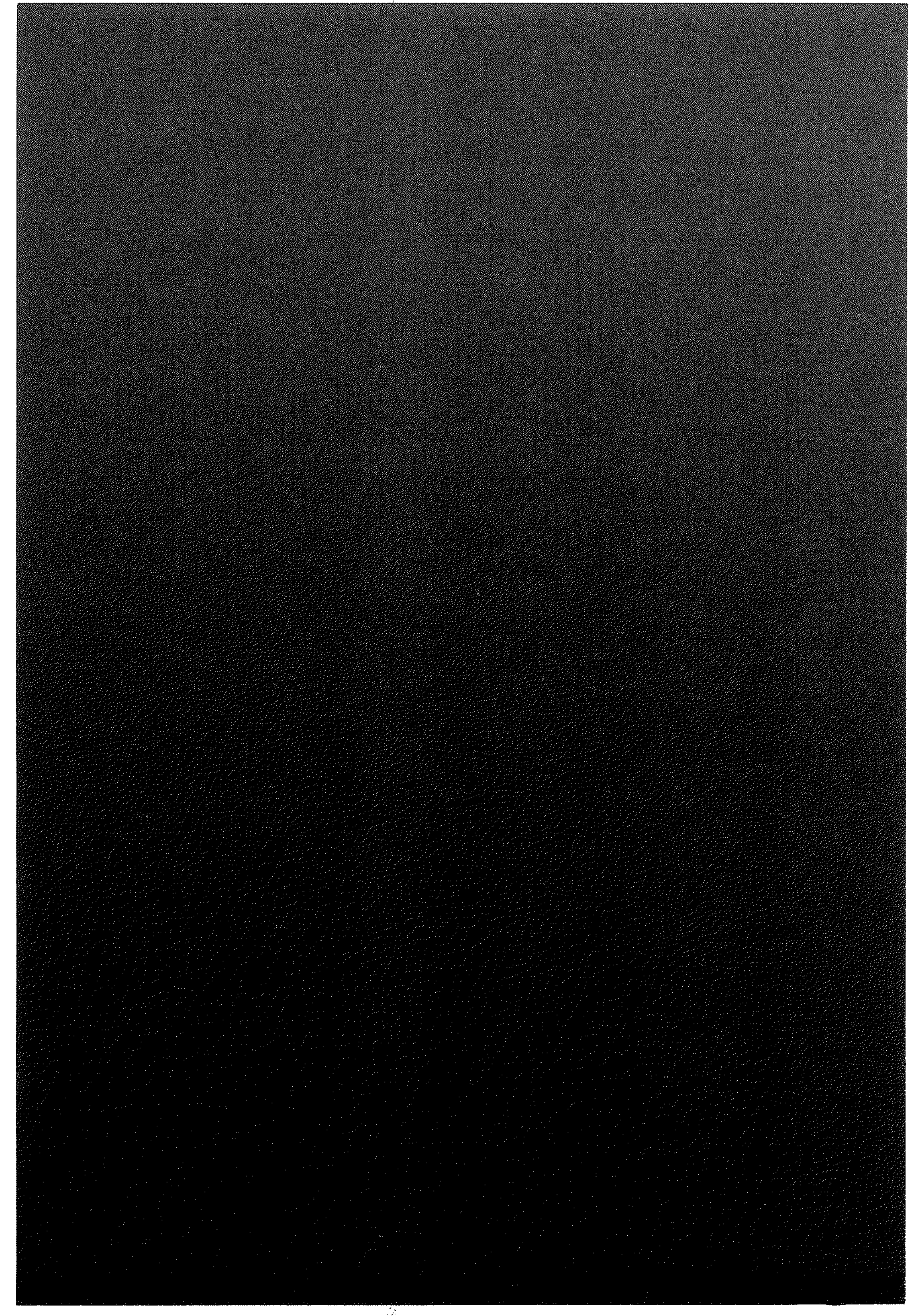
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PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS OF TURKEY CONTAINING TRITERPENIC SAPONINS

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PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS OF TURKEY CONTAINING TRITERPENIC SAPONINS*

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Since the ancient times, saponin containing plants have been used as folk medicine for various purposes. The expectorant and antifungal antibiotic effects of these plant components are especially significant. In addition, the anti-inflammatory, antiexudative, sitostatic effects and antiviral activity, which is reported recently, are other important effects of saponins[1].

Triterpenic saponin containing plants are widely distributed in Turkey. The plants of Polygalaceae, Caryophyllaceae and Primulaceae are the most important and widespread examples. In this paper, chemical and biological investigations on some saponin containing plants of Polygalaceae and Caryophyllaceae, carried out in our department, will be presented.

Polygala is the only genus of Polygalaceae family, found in Turkey, *Radix senegae* is the most important one of the drugs, obtained from this genus. This drug is obtained from *Polygala senega* (a North American species), and appears in the composition of some expectorants.

There are 11 species of Polygala in Turkey [2]. *Polygala pruinosa* subsp. *pruinosa* and *P. anatolica* are the most widespread species among these. But *P. pruinosa* subsp. *pruinosa* has greater roots, in comparison with those of *P. anatolica* [3].

With its 32 genus and about 500 species, Caryophyllaceae is one of the most widespread and richest family of the flora in Turkey. There

* Bulletin of Islamic Medicine, 3:462-468, 1984.

are 46 Gypsophila, 18 Saponaria, 66 Dianthus and 119 Silene species in Turkey.

Gypsophila spec. is the most important genus of Caryophyllaceae. *Radix saponaria* Albae (*R.gypsophilae*), obtained from this genus has been used as an emulsifier and it is also an important exportation matter, known as Turkish Soaproot (for 479.457 kg 63.834 .119 TL. in 1981). But its source was not known exactly. The sources of the 4 kinds of Turkish Soaproot was established with the studies which are carried out in our department[4] (Table-1)

Table 1

Turkish Soaproot Types

Region	Commercial Name	Origin of the Drug
East Anatolia	Soaproot of Van	*G.bicolor* (Freyn.et Sint.) Grossheim
Central-West Anatolia	Soaproot of Konya or Soaproot of Isparta	*G. arrostii* Guss. *var nebulosa* (Boiss. et Heldr.)
Central Anatolia a) Çorum-Yozgat Region b) Nigde Region	Soaproot of Çorum or Soaproot of Yozgat Soaproot of Nigde	*G. eriocalyx* Boiss. *G. perfoliata L. var. anatolica* (Boiss. et Heldr.) Bark.

Among these types, both Soaproot of Van and Soaproot of Isparta/Konya have higher foaming and hemolytic indices (Table-2) and in addition, their crude saponin content are rather high. Both types of Soaproot are accepted as first grade in commerce. As a matter of fact, Soaproot of Van is exported and is used in the obtaining of "Saponinum Purum Album" (Firma Merck).

Soaproot of Nigde, has also higher hemolytic index, but its foaming index and the percentage of crude saponin is rather low. It has also slender roots, so it is accepted as second grade.

Soaproot of Çorum/Yozgat has the lowest values of indices (Table-2) and so it has to be third grade. But its roots are rather big and abundant, so this drug can be provided in larger amounts, and thus is exported to Rumania and Bulgaria, besides being used in food industry.

Table 2

Some Values Concerning The Investigated Plants

Crude Saponin			
	Hemolytic Index	Foaming Index	%
Gypsophila arrostii var nebulosa	5295-6667	9600-10034	19-22
Gypsophila bicolor	6667-6925	9000-10000	20-25
Gypsophila eriocalyx	3385-3659	1800-2000	10-14
Gypsophila perfoliata var. *anatolica*	9778-10000	4650-5000	15-19
Saponaria kotschyi	405	714	5
Polygala pruinosa Subsp. *Pruinosa*	1292	2500	6

There are 18 species of Saponaria in Turkey. The seven of these species are biennial or perennial plants, whose roots can be useful. *Saponaria officinalis* is one of these species and there are sufficient chemical and pharmacognostical investigations on this species. *S. kotschyi* is the other widespread species in Turkey. The results of our investigations on the roots of this plant is summarized in Table 2 and Figure 1.

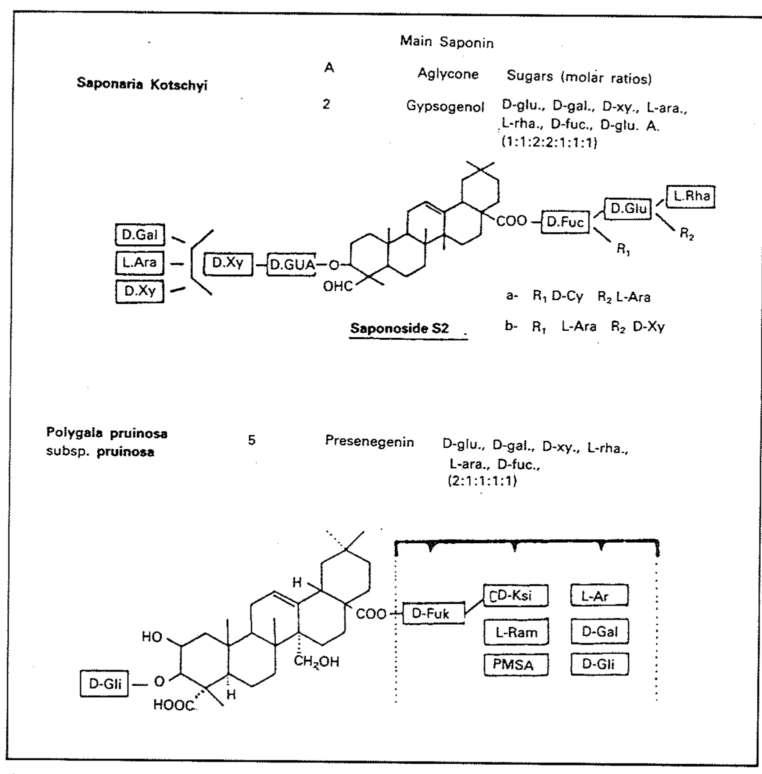
Some significant biological effects of these crude saponins, obtained in our department, have also been determined.

Amongst the saponins we investigated, the crude saponin which is found most effective on micellium-producing fungi, is the one obtained from *Polygala pruinosa* subsp. *pruinosa.* The crude saponins from *Saponaria kotschyi* and *Gypsophila eriocalyx*, also have medium antifungal effect. On the other hand, the crude saponins of *G. bicolor* and *G. arrostii* var. *nebulosa,* have been shown to be effective on *Candida albicans* (Table 3)

In determining antiviral activity of these crude saponins, tissue culture methods and hemagglutination-inhibition method related to the structure of viruses were chosen. According to the results obtained, the crude saponin isolated from *Gypsophila bicolor* showed

the highest antiviral activity. Its crude saponin was active to 5/6 of the viruses used.

Figure 1
Explanations of the Structures of the Main Saponins Elucidated by Sezik, Yesilada and Çalis



A: Saponin spots established by TLC; D-glu.: D-glucose; D-gal.: D-galactose; D-xy.: D-xylose; L-rha.: L-rhamnose; L-ara.: L-arabinose; D-fuc.: D-fucose; D-glu. A.: D-glucuronic acid.

On the other hand, the other Gypsophila spec. were found less active. The crude saponins of *G. arrostii* var. *nebulosa*, *G. perfoliata* and *G. eriocalx* was active to 4/6, 3/6, 4/6 of the viruses, respectively. The crude saponin of *P. pruinosa* subsp. *pruinosa* was active to 5/6 of

the viruses used. The crude saponin of *S. kotschyi* was active to only 3/6 of the viruses used (Table 4).

In our investigations the sources and qualities of Turkish Soaproot were established. In addition to that, the crude saponins of *Polygala pruinosa* subsp. *pruinosa* and *Saponaria kotschyi* were obtained and the structures of their main saponins were elucidated.

On the other hand, antifungal-antibiotic and antiviral activities of these crude saponins were investigated. Amongst these, the crude saponins of *Polygala pruinosa* subsp. *pruinosa* and *Gypsophila bicolor* showed the highest antifungal antibiotic, and *G. bicolor* showed the highest antiviral activity.

According to these results, we can expect that the crude saponins can be used externally for antifungal and antiviral purposes.

Table - 3

Antifungal Activities of the Crude Saponins obtained from the Investigated Plants

	Alternaria solani	*Aspergillus flavus*	*Asp.fumigatus*	*A. niger*	*A. ochraceus*	*A. versicolor*
Gypsophila arrostii	+ +	++ +	+++ ++	++ +	++ +	0 0
Gypsophila bicolor	+++ +	++++ ++	+++ +	0 0	++ +	+++ 0
Gypsophila eriocalyx	++ +	++++ +++	++ +	++++ +++	+++ +	++ +
Gypsophila perfoliata	+++ ++	++ ++	++ +	++ 0	++ +	+++ 0
Saponaria kotschyi	+++ +++	+++ ++	++++ +++	++ +	++++ +++	++ +
Polygala pruinosa subsp. *pruinosa*	++++ ++	++++ ++++	++ +	++++ ++++	+++ ++	++++ ++
	Fusarium oxysporum	***Penicillium expensum***	***Candida albicans***			
Gypsophila arrostii	++ +	++ ++	++++ ++			
Gypsophila bicolor	++ +	++ +	+++ ++			
Gypsophila eriocalyx	++ +	+++ ++	- 0			
Gypsophila perfoliata	+ +	++++ ++++	0 0			
Saponaria kotschyi	++ +	+++ +	0 0			
Polygala pruinosa subsp. *pruinosa*	++++ ++	++++ +++	0 0			

Table - 4

Antiviral Activities of the Crude Saponins obtained from the Investigated Plants

	Polio type-1	Herpes type-1	Herpes type-2	Vesicmlor stomatitis	Influenza A2	Parainfluenza type
Gypsophila arrostii	+ -	-	+ -	+ +	+ - -	-
Gypsophila bicolor	+	+	+	+ +	+ - -	-
Gypsophila perfoliata	+ - -	-	+	+	+ - -	-
Gypsophila eriocalyx	-	-	+ - -	+	+ - -	-
Saponaria kotschyi	+ - -	-	+ - -	+ +	-	-
Polygala pruinosa subsp. *pruinosa*	+	+	+ - -	+ +	+ -	-

(+ +) Strong
(+) Medium
(+ -) Partially effective
(+ - -) Weak
(-) None

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PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS USED AS FOLK MEDICINE IN TURKEY - I

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TURKEY

PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS USED AS FOLK MEDICINE IN TURKEY - I*

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In every region of Turkey, many plants are being used as folk medicine or herbal tea. In this paper, our investigations on the plants which are used for different purposes in the surroundings of Antalya-Isparta-Konya are summarized. Taxonomical, morphological and anatomical results of our studies[1,2] are excluded from this paper. Active compounds (especially the structures of flavonoids and volatile oils) of the plants were elucidated and still being elucidated. In this first part of the paper, the results of our studies on Sideritis and Ziziphora will be presented.

There are 38 Sideritis (Labiatae) species in Turkey, 31 of them are endemic and widespread in South Anatolia[3].

Sideritis congesta, arguta, argyrea, perfoliata and *libanotica* are being used in the form of infusion as herbal tea and folk medicine in the surroundings of Antalya-alanya against gastrointestinal disorders, kidney stones, cold and as diuretics.

The results of our chemical studies on *S. congesta* are given below:

The leaves, flowers and the stems of *S. congesta* have been used in chemical studies. When it is extracted with petroleum benzene, the extract has one methoxyflavon and diterpenes. The structures of this methoxyflavon and the main diterpene have been identified after separation by column chromatography.

It has been determined that the main diterpene is the same as the authentic sample of linerol (3, 7-dihydroxy-18-acetoxy-(-)-kaurene) with respect to its chromatographic behaviour, melting point, optical

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rotatory. Its analytical definitions are as follows; its mp is 198-201° C, (α)D^{20} is-63, 8. IR peaks are at 3500, 3400, 3080, 1710, 1660, 1270, 1070, 1025 and 882 cm^{-1}. NMR findings are 4.85, 3.70 and 1.07 ppm. Its mol. wt. which is determined by mass spectra is 362. For linearol (CHO $C_{22}H_{34}O_4$) the theoretical quantities of carbon, hydrogen and oxygen are 72. 93 ,9.39 and 17.68 per cent. The practical values of the same components are 72.89, 9.45 and 17.66 per cent respectively.

The structure of linearol is confirmed by comparing the acetyl and deacetyl derivatives of linearol prepared with the authentic standards, acetyl linearol and foliol by chromatography.

The methoxyflavon that the plant contained is determined as salvigenin which is 5-hydroxy-6,7,4′-trimethoxyflavon considering its melting point, UV, IR, NMR and Mass spectra. Its mp is of 190° - 193 °C, UV peaks in methanol are seen at 330, 277 nm. In sodium methoxide, peaks are obtained at (375), 298, 270, 260 and (245) nm. In aluminium chloride these values are as 362, 302 and (266) nm. In aluminium chloride and hydrochloric acid mixture, the peaks are at 353, 302, 265 nm, in sodium acetate at 332, 275 and in sodium acetate, boric acid mixture at 332 and 275 nm respectively. It gives, IR peaks at 3080, 1640, 830 and 710 cm^{-1}. Where as NMR values are of 12.70; 7.92; 7.84; 7.01; 6.98; 6.57; 6.53; 3.90, 3.96 and 3.92 ppm. Its mol. wt. is found as 328.

After extracting with petroleum benzene the material has been treated with 80% etanol and the ethanolic phase was evaporated. The residue, then dissolved in hot water and it has been extracted with ether, ethyl acetate and n-butanol respectively. The ethyl acetate phase yields two main flavon heterosides, separated by column chromatography and preparative TLC. However, the acid hydrolysis of these heterosides show that their aglycons are the same.

The aglycon is found as chrysoerial (5,7,4′-trihydroxy-3′-methoxyflavon). Investigating its chromatographic behaviour, melting point, UV, IR and Mass spectra the following values are

obtained; its mp is 330° C, UV spectra in methanol gives peaks at 348, 270, (252), 244nm. Where as in sodium methoxide, peaks are obtained at 405, (330), (277), 269 nm. In aluminium chloride the peaks are at 388, 361, (295), (275), 262 nm, in aluminium chloride hydrochloric acid mixture at 386, 355, (295), (278), 260 nm and in sodium acetate at 398, 320, 272 nm, in sodium acetate boric acid mixture at 353 and 270 nm. In infrared spectrophotometry the peaks are obtained at 3340, 1640 and 2900 cm^{-1}. Its molecular weight is found as 300.

The ose moiety of the flavon heterosides has been found as glucose. The acid hydrolysis of the permethylated flavon heteroside indicates that one of the heterosides contains one ose and the other heteroside has two.

It has been determined that the oses of the two heterosides have been attached to the aglycons from the seventh position, comparing the UV spectra of the heterosides and the aglycons.

In accordance with the results mentioned above, the structure of the flavon heterosides has been determined as chrysoeriol-7-glucoside and as chrysoeriol-7-diglucoside.

On the other hand, in our following research, it is shown that the other Sideritis species are carrying linearol.

In South Anatolia, *Ziziphora taurica* ssp. *taurica* (Labiatae) is another plant which is being used as folk medicine, in the surroundings of Isparta. There are 5 Ziziphora species in Turkey. *Z. clinopodioides, persica, capitata, tenuiour, taurica. Z. taurica* has 2 subspecies: ssp. *taurica* and *cleonioides*. The only Ziziphora species which is being used as herbal tea and folk medicine against gastrointestinal disorders is *Z. taurica* ssp. *taurica*. Our studies on the volatile oil of *Z. taurica* ssp. *taurica* are summarized below.

Chemical investigations were carried out on the volatile oil obtained from the herb of *Ziziphora taurica* subsp. *taurica* gathered while the plant was blossom. The volatile oil, the amount of water and

the physiochemical values of the volatile oil material contained are shown below (Table-1,2).

TABLE 1

VOLATILE OIL AND WATER CONTENT

Material	Essential Oil Content %		Water Ceontent %
	Gravimetric Method	Volumetric Method	Volumetric Method (v/w)
Fresh	0.23 g/g	0.41 ml/g	65.23 ml/g
Dried	0.40	0.85	10

It has been determined by using the gravimetric method that 9.6% of the volatile oil was made of MTHC (monoterpene hydrocarbons) and 90.4% OCMT (oxygen containing monoterpenes) and sesquiterpenes. It has been demonstrated by using the GLC (Gas-liquid Chromatography) that the monoterpene hydrocarbons in the volatile oil were made of β-pinene (1.25%), camphene (0.45%), α-pinene (1.49%), Δ^4-Carene (0.73%), sabinene (0.34%), myrcene (0.46%), limonene (3.91%), β-phellandrene (0.08%), γ-Terpinene (0.05%), cis-β-Ocimene (0.43%), Terpinolene (0.02%), trans-β-Ocimene (0.33%) and oxygen-containing monoterpenes had 1:8 Sineol (1.08%), fenchone (2.35%), Thujone (1.99%) menthone (0.27%), isomenthone (2.89%), linalool (2.17%), methyl acetate (0.72%), isopulegone (4.88%), menthol (0.54%), pulegone (38.4%), α-terpinol (2.17%), borneol (0.90%) piperitone (2.0%), Carvon (0.81%), thymol (0.19%).

Table-2

PHYSICAL PROPERTIES

Determination		Value
Specific gravity, 20°C		0.9475
Optical rotation, 20°C		+ 22°72
Refractive index, 20°C		1.4782
Solubility in ethanol,	70°	Turbid soluble in 2v. and more
	80°	Turbid soluble in 2v. and more
	90°	Turbid soluble in 2v. and more
	96°	Clearly soluble in 1 v. and more
Acid index		2.06
Acids value		3.78
Saponification index		10.64
Ester index		8.58
Acetyl index		156.8
Determination of Ketons		
a) Semicarbazide method		64.18% (w/w)
b) Neutral sulphite method		68% (v/v)

The dominant compound, pulegone, was isolated by liquid-solid chromatography. Its physicochemical properties were determined and its structure is elucidated by using UV, IR spectras.

In other countries also, the herbs of Sideritis and Ziziphora species are being used as tea and folk medicine.

In Bulgaria, Albania, Yugoslavia and Russia[4], *S. scardica*; in France[5], *S. romana* as herbal tea; and in other European Countries species such as *S. hirsuta, scardioides, hyssopifolia, montana*[5,6,7] are being used as tonic and against cold. In our research, it is established that *S. congesta, arguta, argyrea, perfoliata* and *libanotica* are also used as folk medicine and we have elucidated the structure of the diterpenes and flavonoids of *S. congesta.*

In India[(8)] *Z.clinopodiodes* is being used against typhus fever while *Z. tenuior* is used as expectorant, carminative and aphrodisiac. In Russia[9] *Z. turcomanica* is being used against heart-vessel disorders. As a result of our study we have established that *Z. taurica* ssp. *taurica* is a folk medicine and we also elucidated the composition of its volatile oil.

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PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS USED AS FOLK MEDICINE IN TURKEY -II*

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PHARMACOGNOSTICAL INVESTIGATIONS ON THE PLANTS USED AS FOLK MEDICINE IN TURKEY -II*

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In our second paper about the same subject, our investigations on *Thymus sipyleus* Boiss. (Labiatae) and *Stachys lavandulifolia* Vahl. *var. lavandulifolia* (Labiatae), which are being used as folk medicine and herbal tea, and also our study on *Ecbalium elaterium* (Cucurbitaceae), a widespread folk medicine for sinusitis, will be summerized.

T. sipyleus is being used as a folk medicine for the treatment of gastrointestinal disorders in the surroundings of Beysehir and Isparta.

Chemical studies were made on the leaves of *Thymus sipyleus* Boiss. The samples were first extracted with petroleum ether (b.p. 40-60°C). The precipitate formed in the extract on standing was purified by column chromatography followed by several crystallizations and identified as oleanolic acid.

Oleanolic acid: m.p. 304-307°C, $(\alpha)\,D^{20} + 78'$ (in chloroform), mol. wt.: 456 (according to Mass spectrometry). IR: 3440 cm^{-1}, 1690 cm^{-1}, 1030 cm^{-1} Mass: 248, 209, 133.

The remaining residue was extracted with 80° ethanol. Removal of the solvent gave a solid which was partially dissolved in hot water. Following filtration aqueous phase was extracted succesively with ether and ethylacetate. The solvent was removed from the latter to give a yellow solid mixture composed of approximately nine fractions.

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The mixture was separated on a cellulose column; the flavonoside containing fractions were combined; the solvents were evaporated to give a yellow residue. This yellow residue is dissolved in ethanol and carried on two dimentional preparative PC, in first development the solvent system was t-butanol/acetic acid/water (3:1:1), and in the second development, it was 15% acetic acid. The flavonoside mixture was re-purified on silicagel (Kieselgel G60) plates and pure flavonoside was obtained. The pure flavonoside was hydrolysed with hydrochloric acid (5%), then aglycon extracted with ether. The aglycon was purified on silicagel (Kieselgel G60) plate using toluene / ethylacetate/ methanol (8:6:1) as solvent system, then was crystalized from methanol/water mixture. The analytical data showed that the aglycone was quercetin.

Quercetin: m.p 317° C, PC R_f values in water O,with water/ phenol 0.38,n-buthanol/ acetic acid/water 0.77, c. hydrochloric acid/ acetic acid/water (4:1:5) 0.77, t-butanol/acetic acid/water (3:1:1) 0.53, 15% acetic acid 0.07. C,H,O: for $C_{15}H_{10}O_7$, $2H_2O$ estimated calculations for C 53.26%, for H4.17% for O 42.57%. The experimental findings were as follows: C 53.59%, H 5.10%, O 41.30%. UV spectra (maximums innm) in methanol 255, (270), (300), 370; in sodium methylate (dec.); in aluminium chloride 262, (304), (333), 455; in aluminium chloride/ chlorhydric acid 262, (300), (360), 428; in sodium acetate 265, 278, 330, 390; in sodium acetate/boric acid 260, 303, 387.

IR: 3360 cm^{-1}, 3030 cm^{-1}, 1660 cm^{-1}, 1005-1010 cm^{-1}, 1085 cm^{-1}, 840 cm^{-1}, 825 cm^{-1}, 810 cm^{-1}, 785 cm^{-1}, 720 cm^{-1}, 705 cm^{-1}.

The aqueous phase of the hydrolisation product is neutralised , filtrated, evaporated and applied to descedent PC by use of the solvent system n-butanol/pyridine/ water (9:5:4) and the ose was identified as galactose.

The binding of galactose to aglycone was determined by use of zirchonium oxychloride and UV spectra.

According to the methods mentioned above, the flavonoside was identified as quercetine -3 - galactoside (hyperoside). Hyperoside: m.p. 324-236°C (dec.), PC R_f values in water 0.10, in t-butanol/water/phenol 0.50, in n-butanol/acetic acid/water (4:1:5) 0.70, in t-butanol/acetic acid/water (3:1:1) 0.43, in c. hydrochloric acid/acetic acid/water (3:10:30) 0.43, in 15% acetic acid 0.42, C,H,O: for $C_{21}H_{20}O_{12} \cdot 2\frac{1}{2}\ H_2O$ estimated calculations for C 49.5%, for H 4.95%, for O 45.55%. The experimental findings were as follows: C 48.53%, H 4.48%. O 46.63%.

UV spectra (maximums in mμ): in methanol 258, (272), (300), 363: in sodium methylate 330, (412) (dec.); in aluminium chloride 265, (300), (332), 435; in aluminuim chloride/hydrochloric acid 265, 300, 365, 405; in sodium acetate 278, 325, 385; in sodium acetate/boric acid 260, 300, 375.

One of the herbal tea used in the surroundings of Gündôgmus (province of Antalya, S. Anatolia) is obtained from *Stachys lavandulifolia* (Labiatae) and is named as "tüylü çay" (hairy tea).

The volatile oil of this plant was studied and the composition of the volatile oil elucidated.

Fractionation of the Essential Oil: In order to obtain a better resolution in GLC, the oil was fractionated by column chromatography. In fractionation Kieselgel 60 (Merck 7734), containing 5% w/w water, is used as absorbent and n-pentane as eluent for MTHC; diethylether for OCMT.

GLC Systems: Being lack of capillary columns, the analysis in GLC were realised at 5 different conditions. The first 3 systems were used in identification of MTHC mixture, while the other 2 were for OCMT. Gas Chromatograph: Packard-Becker 419-Detector: FID, 200°C - Injection Port: 200°C - Column: Copper, 800x0.15 cm ID - Stationary Phases: PEG 20M, 60°C - ββ′ ODPN, 36°C -SF 96,80°C - PEG 20M, 140°C.

SF 96, 120° C. In analysis, each fraction was concentrated to 0.5 ml under reduced pressure at ca. 0° C and 2 μl was chromatographed.

Results: According to the methods estimated in pharmacopeias; the oil yield of fresh material, which had 49% v/w water, was 0.08 w/w and 0.20 v/w, while the oil content of dried material (6.65% v/w water) was 0.25 w/w and 0.40 v/w.

The results of the volatile oil according to the gas chromatograms are tabulated in Table-1.

The use of the fruit juice of *Ecbalium elaterium* (L.) A. Rich. in the treatment of sinusitis as a folk medicine is very common in Turkey. In our research, the effect of the fruit juice in sinusitis and the convenient doses for the treatment of sinusitis are investigated.

Fruit juice was used by 49 patients, who had sinusitis and nasal obstruction recovery is observed in 71.43% of these patients. Fruit juice has no effect on thickening of mucous membrane and cysts. The cysts can be seen clearly in X-Ray examination after the application of the fruit juice of *Ecbalium elaterium*.

As a result of our studies summerized above, it is shown that another Thymus species (*T. sipyleum*) is used as folk medicine. Also, we have established the usage of a Stachys species as a folk medicine for the first time and elucidated the composition of its volatile oil.

On the other hand, by the help of clinical applications on the patients who suffer from sinusitis, we have proved the effect of the *Ecbalium elaterium* fruit juice in sinusitis.

Table -1

The results of the GLC analysis

Compound	% in Vol.Oil	Compound	% in Vol.Oil
α- pinene	3.83	Citronellal	0.40
Thujene	0.40	Linalool	2.84
Camphene	0.24	Menthone	3.11
β- pienene	2.98	Menthyl acetate	0.65
△ 3 - carene	2.16	Terpinene -4 -ol	4.36
Sabinene	1.20	Caryophyllene	11.32
α-phellandrene	0.24	Insopulegone	1.52
Myrcene	3.30	Menthol	2.30
α - terpinene	0.24	α- terpineol	2.84
Limonene	1.24	Borneol	1.35
β - phellandrene	2.20	Cadinene	3.57
γ- terpinene	0.48	Verbenone	1.19
Cis-Ocimene	0.48	Citronellol	1.19
Terpinolene	0.48	Geranyl acetate	0.71
trans-Ocimene	0.16	Geraniol	0.53
p-Cymene	0.40	Methyl eugenol	3.61
1.8 Cineole	8.65	Unknown	25.12
Ethyl amyl ketone	1.92		
Fenkone	0.80		
Thujone	1.99		

A PHARMACOGNOSTICAL RESEARCH ON TURKISH TILIA SPECIES

Drs. M. Tanker, N. Tanker, G. Toker

TURKEY

A PHARMACOGNOSTICAL RESEARCH ON TURKISH TILIA SPECIES*

Drs. M. Tanker, N. Tanker, G. Toker
TURKEY

The inflorescence of Tilia species grown in Turkey were investigated according to active substances contained and some results were compared with the samples of Tilia which are grown in France.

The following species are grown wild in Turkey:
T. argentea Desf. ex DC (*T. tomentosa* auct.)
T. rubra DC.
T. platyphyllos Scop.

T.rubra and *T. tomentosa* are wide spread, whereas *T.platyphyllos* is rarely found. These three species are easily distinguished from one another by means of the leaf shapes and hairs. In addition *T. tomentosa* is separated from the two species by means of staminodium of the flowers.

The flavonoides such as kaempferol and quercetin are found in these species. Total flavonoid assay was determined spectrofotometrically, after the hydrolysis of the flavonoid glycosides in the alcoholic extracts of inflorescences. The following values were calculated:

T. tomentosa	0.66%
T.rubra	1.13%
T. platyphyllos	1.13%

Volatile oil content in Tilia species varies between 0.044% to

* Bulletin of Islamic Medicine, 3:441, 1984.

0.050%. Fernesol was found in trace amount. The volatile oil was found to consist mainly of hydrocarbons, phenyl ethyl alcohol and esters.

The mucilage was obtained by extraction with cold and hot water from the inflorescences and then precipitated by ethanol. The following amount of the mucilage are:

T. tomentosa	7.2%
T.rubra	6.2%
T. platyphyllos	6.5%

The yield of mucilage in the sample from France was 6.7%. The structure of the mucilages of the species are all the same. It has been found clear that the mucilage consisted of glycose, galactose, arabinose, xylose, rhamnose and galacturonic acid.

By determining viscosity of mucilage in flowers and bractes, flowers had more mucilage than the bractes. *T.tomentosa* flowers had the maximum mucilage content.

RESEARCH METHODOLOGY FOR CLINICAL STUDY OF BRONCHIAL ASTHMA (*ZEEQUN NAFAS*)

Hkms.K.M. Siddiqui, J. Iqbal and U. Fazal

INDIA

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INDIA

INTRODUCTION

Bronchial asthma is one of the commonest intractable diseases which not only incapacitates the patients but also leads to considerable loss of mandays. It is a condition for which the modern system of medicine does not have a very satisfactory line of management in terms of efficacy as well as safety. The Unani system of medicine (Islamic medicine), on the other hand, claims useful remedies which are said to be not only efficacious but also devoid of serious side effects. These drugs are simple to prepare and inexpensive.

Breathing in air is included in six essential causes of life (*Asbab-e-Sitta Zarooriya*) and is an involuntary and unconcious phenomenon[1,6,7]. According to Galen[2] fresh air is essential to cool the firey furnace of heart (which keeps the body warm) and to instil vital spirit into the blood. Exhaled breath warmed by its encounter with the heart's heat carries away impurities. Any disease disturbing the phenomenon of breathing is of much attention and requires immediate necessary treatment, and bronchial asthma is among one of these diseases. Scholars of Islamic medicine[3,4,5,6] were well aware about the etiology and pathogenesis of bronchial asthma since long. They called bronchial asthma as *Zeequn Nafas* or *Buhar*, prescribed a number of drugs and treated so many cases. Avicenna[3] described *Zeequn Nafas* as difficulty in breathing due to narrowing in the air

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passages caused by inflammation (*waram*) of mucous membrane (*Ghisha-e-mukhati*) of trachea (*Qasbat-ur-Riya*), bronchi (*Shobaha-e-Qasba*), bronchioles (*Jirm-e-Riya*) and alveoli (*Khalkhala-e-Riya*) leading to secretion and accumulation of tenacious humour (*Khilt-e-Lazij*) or thick humour (*Khilt-e-Ghaliz*) or watery humour (*Khilt-e-Mayee*). Patients feel much difficulty in supine position than in sitting or standing positions[8]. Avicenna[3] was also of the view that *Zeequn Nafas* hardly cures in old age. Describing the pathogensis of disease Majoosi[4] states that the cause of narrowing is cold humour (*Khilt-e-Lazij*) or thick humour (*Khilt-e-Ghaliz*) which sticks to the walls of air passages and the physique (*Tabiyat*) wants to expel it by repeated laboured expiration and thus the expiratory process is prolonged. Increased rate of respiration is due to inadequate supply of oxygen (*Naseem*) to lungs and *Tabiyat* tries to fulfil it[3,4,5,6,8]. He[4] wrote that *Zeequn Nafas* is a hereditary disease and generally occurs in middle age.

ETIOLOGY

Describing the etiology of *Zeefqun Nafas*, Islamic physicians[3,4,5,6] listed following causes.

2.1. Predisposing causes

(a) Heredity
(b) Middle age
(c) Sex (Male are more prone)
(d) Emotion, excitement, anger, fear, exercise, fatigue etc.
(e) Cold climate
(f) Non-ventilated residence

2.2. Exciting causes

(a) Thick and tenacious phlegm (*Balgham-e-Ghaliz* or *Lazij*) produced in the lungs or in other parts of the body infiltrating in air passages.

(b) Spasm (*Tashanuj*) of muscles of trechea and bronchi.
(c) Inflammation of mucous lining of air passages.
(d) Disorders of heart.
(e) Chest effusion.
(f) Dryness and coldness of lungs.
(g) Abnormal function of centres of nervous system responsible for rhythmic respiratory movements.
(h) Inflammation of related organs of lungs e.g. liver, stomach, spleen, diaphragm etc.
(i) Excess of carbon dioxide (*Bukharat-e-Dukhaniya*) in the lungs.
(j) Congenital narrowing of chest.

PATHOGENESIS

(a) Spasm in bronchial musculature narrowing the calibre of bronchi[3,4].
(b) Inflammation of mucous membrane (*ghisha-e-mukhati*) of air passages lessening its lumen[3,4,5].
(c) Collection of secretions in the bronchi blocks the air passages[3,4,5].

SYMPTOMATOLOGY

Signs and symptoms of *Zeequn Nafas* are recurrent attacks of wheezing, dyspnoea, cough and expectoration of mucoid sputum[2,3,4,5,6,9].

DIAGNOSIS

Diagnosis of the patients will be performed on the basis of history of the patient, thorough clinical examination and laboratory findings. Detailed history of the patients will be recorded on the proforma (Annexure-I). Besides general examination of the patients, all systems will be examined with particular emphasis on respiratory and

cardiovascular systems on the proforma (Annexure-II). Investigations will be performed as per Annexure-III.

SELECTION OF DRUG

Keeping in view the pathogenesis of the disease, selection of the drug to be tried will be made by experienced research scholar who is capable of selecting the drug by considering the following points as described by Islamic physicians[4,5,10,11].

(A) The drug should be least toxic, most suitable and easily available.

(B) The drug should be of high quality and free from any extrinsic or intrinsic alteration.

(C) Pharmacological action of the drug should be performed on such a mammal whose temperament resembles most with that of human being e.g. monkey.

(D) The source of the drug, form, therapeutic dose, mode of administration, temperament, fate and excretion must be known before starting clinical trial.

(E) The drug should be collected according to method and time mentioned in Unani literature and the preservation of the drug be made accordingly.

(F) Pharmaceutical processing must be done according to scientific methods.

(G) The drug should be selected according to temperament of patients and it should be quantitatively and qualitatively approximate to the intensity of the disease.

The drugs mentioned by Islamic medicine scholars for the treatment of *Zeequn Nafas* are noted in Annexure-IV.

METHODS OF CLINICAL TRIAL

Evaluation of a new drug in human being should be carried out by clinical pharmacologists who have adequate background in animal studies and necessary facilities, and use drugs continuously and

critically with continuing analyses of results. The clinical trial of new drug completes in four stages[11].

1. Preliminary study	(Phase I)
2. Controlled study	(Phase II)
3. Double Blind study	(Phase III)
4. Final study	(Phase IV)

1. Preliminary Study: The initial study should be planned to evaluate the effect of the drug on the patients suffering from bronchial asthma and to find out:

(i) Whether the drug in any way modifies the course of the disease.

(ii) Safety and toxicity of the drug.

(iii) Other pharmacological effects that it produces other than therapeutic action.

Such studies are carried out by competent investigators at limited centres. The aim of this study is to obtain precise informations from smallest sample in minimum time. The drug should be prescribed for sufficiently long time in uniform cases in respect of age, sex and severity of disease. Both subjective and objective evaluation should be done along with laboratory studies.

2. Controlled Study: To avoid psychological indulgence of doctor and patient and to assess the subjective relief of symptoms such as chest pain, sleeplessness, dyspnoea etc. controlled clinical trial are absolutely necessary. This type of study is defined as one where a new drug therapy is compared with the previously established therapy or placebo. In this study patients are randomly divided into two groups, out of which one group gets new drug while the other receives control drug with either a previously established drug or placebo. In this study patient is unaware whether he is getting drug or placebo.

3. Double Blind Study: In this study both, evaluating investigator and patient are unaware of the drug. The specimens for laboratory

investigation are submitted under a code number. Day to day report is recorded by investigator. The drug is decoded only after the trial is completed.

4. Final Study: The results of double blind controlled trials at few centres will be comfirmed by trials at many more centres before the drug is released for general use.

DURATION OF TREATMENT AND FOLLOW UP

The period of treatment will be 4 months and observation for one year. The patients will be followed up every fortnight during the period of treatment and information will be ascertained on the proforma (Annexure-V). During the period of observation, three monthly follow up will be carried out and informations will be collected.

Response

Response of the drug will be assessed in terms of:

(i) Relief in acute attacks of bronchial asthma.

(ii) Increased interval between attacks.

(iii) Decrease in severity of an acute attack of asthma.

Interpretation

After completion of clinical trial the results will be subjected to statistical analysis. If the difference between the two groups is so large that the possibility of its occurence simply by chance is less than three times in 100 ($P < 0.03$) then the new drug is said to have significant effect. However, before acceptance it is necessary to rule out all possible explanations for such difference.

CONCIUSION

following the above principles one can get accurate results of drugs and thus a lot of therapeutically worthless, costly and even toxic compounds can be prevented from reaching the hands of clinicians.

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ANNEXURE - I
PROMORMA FOR TRIAL OF BRONCHIAL ASTHMA

Name:		Age	Sex
Parentage			
Religion			
O.P.D. No.		Allergy Clinic No.	
Date of First Consultation			
Hospital No.		Bed No.	
Date of admission		Date of discharge	
Occupation:	Present	Nature of work:	
	Past	Physical, mental, sedentary	
Education			
Marital status	Married / Unmarried		
Monthly income (per capita)			
Address for correspondence:		Rural	Urban
Local	Village	P.O.	
	Deh.	Distt.	
	Pradesh	Pin	
Permanent Address:			
	Village	P.O.	
	Deh.	Distt.	
	Pradesh	Pin	

Referred by:

Chief complaints with duration.

1.

2.

3.

4.

5.

6.

Treatment if already taken

Present History / Illness

(a) Time, place, relationship of attacks

(b) Progress of sign and symptoms

Breathlessness	Duration	Time
Seasonal / Perennial	Paroxysmal / Continuous	
Frequency and duration of attacks		
Wheeze	Bilateral	
Chest pain	Yes/No	
Cough	Yes/No	Dry/Productive
Past similar illness	Yes/No	

Respiratory Disease

Asthma, Bronchitis	Pneumonia
Pulmonary Kock's	Others

Any cardiovascular symptoms

Any gastro-intestinal symptoms

Any associated allergic disease

Uriticaria	Yes/No
Eczema	Yes/No
Burning	Yes/No
Itching	Yes/No
Allergic conjunctivitis	Yes/No

Rhinitis	Yes/No
Sinusitis	Yes/No
Angioneurotic oedema	Yes/No

PAST HISTORY

What illness he/she had in past

Respiratory disease:

	T.B.	Bronchitis	Asthma	Others
Skin allergies	Urticaria	Burning	Itching	Others

Renal diseases

G.I.T. diseases

Childhood diseases: Measles
Mumps
Chicken pox
Smallpox
Whooping cough

(b) When he/she had them with their duration

(c) History of recurrent respiratory tract infections: Yes/No

FAMILY HISTORY

(a) Grand parents
Parents
Children
Brothers and sisters
Their status of health
Cause of their death
At what age

(b) Similar illness	Yes/No
C.V.S. disease	Yes/No
G.I.T. disease	Yes/No
C.N.S. disease	Yes/No
Diabetes	
Respiratory diseases	
Tuberculosis	
Asthma	
Bronchitis	
Others	
Skin diseases	
Urticaria	
Burning	
Itching	
Others	
Rhinitis	Yes/No
Sinusitis	Yes/No
Allergic conjunctivitis	Yes/No

PERSONAL HISTORY

(a) A brief account of a typical day of patient

(b) Patient's home

(c) Patient's family relations

(d) Patient's daily habits

(e) Diet: Vegetarian   Non-vegetarian   Occasional non-veg.

Balanced   Rich   Deficient

Rest after meals   { Physical work after meals   { Mental work after meals

Number of meals

(f) Exact nature of patient's occupation

(g) Whether patient is exposed to certain allergens

(h) Patient's business affairs

(i) Patient's ambitions

(j) Patient's anxieties (Anxiety Scale)

(k) Patient's quarrel (if any)

(l) His attitude towards his work (occupational adjustment scale)

(m) Home surrounding

(n) Sanitary condition

(o) Any overcrowding (home)

(p) Any pet patient keeps

(q) Patient's domestic relations (home adjustment scale)

(r) Patient's marital relation (mental adjustment scale)

(t) Hopes

(u) Fears

(v) Amount of exercise patient takes

(w1) Games he plays

(w2) Mental fatigue

Habits / Addiction   Alcohol

Tobacco Chewing-Smoking

Others

Whether patient has lived in other part of country or world.

Whether patient ever got the parent's illness or some associated diseases

ALLERGIC HISTORY (PERSONAL)

I. Inhalants -

Symptoms induced (1)

(2)

(3)

(4)

(a) Dust-	House dust	Road dust
	Rural dust	Bed-room
	Pillow type	Cotton U-Foam
	Mattress type	Dari
	Gadda	Kambal
	U-Foam	Others

(b) Moulds-

Symptoms induced

(1)

(2)

(3)

Around the cattle, hay, old leaves, alcohol, lake side.

(c) Danders-

Symptoms induced

(1)

(2)

(3)

(4)

Cat Cow Goat Dog Bull Bird

(d) Miscellaneous

Symptoms induced

(1)

(2)

(3)

(4)

Cosmetics	Chemicals	Perfumes	Paints
Newspaper	Wood		

(e) Bacteria and their products (attack after infection).

(f) Parasites

Parasites	Hookworm	Roundworm	Pinworm
Tapeworm	Others		
Silk			

II. Foods

Symptoms induced

(1)

(2)

(3)

(4)

Wheat	Banana	Potato	Groundnut	Rice
Tomato	Corn	Coffee	Tea	Milk
Beans	Peas	Oranges	Apples	Fish
Egg	Goatmeat	Chicken	Others	

III. Drugs

Symptoms induced

(1)

(2)

(3)

(4)

Aspirin Quinine Sulpha B. Complex group Penicillin

Any other

Injectants Diphteria Antitoxin Other

IV. Immunization Status

Smallpox	Yes/No
Polio	Yes/No
BCG	Yes/No
Cholera	Yes/No
TAB	Yes/No
Diphtheria	Yes/No

V. Physical agent and habits

Symptoms induced

(1)
(2)
(3)
(4)

Smoking   Hukka   Bidi   Cigarettes

Heat and cold	Yes/No
Alcoholic	Yes/No
Cloudy weather	Yes/No
Tobacco chewing	Yes/No
Smoke, kitchen, exhausts	

Emotional stresses	Nervous	Emotional
	Fatigue	Worry
Endocrinal factors	Puberty onset	
	Menstruation	
	Menopause	
	Pregnancy	

Photosensitivity / Watering eyes / Burning / Skin rashes

SYMPTOMATOLOGY

G.I. Disturbances

Nausea/loss of appetite/	Pain abdomen
Diarrhoea / vomiting	Heart Burn

Respiratory system:

Cough	Yes/No
Seasonal	Summer / Rainy / Spring / Winter / Autumn
Expectoration	Yes/No
Dyspnoea	Yes/No
Chest Pain	Yes/No
Wheeze	Yes/No
Fever	Yes/No
Haemoptysis	Yes/No

C.V.S: Palpitation - Dyspnoea - Chest - Pain - Cyanosis - Oedema

C.N.S: Headache - Abnormal - Movements - Convulsions - Sensory loss

Eyes: Burning - Watering - Redness

Nose: Running nose - Sneezing - Blocking

Throat: Post-nasal drip - Snoring - Itching in throat - Persistent cough - Sinusitis - Headache - Local tenderness

Annexture II
PHYSICAL EXAMINATION

General	Appearance	Intelligent	Cooperative
Body build-	Moderate	Undernourished	Well nourished
		Ectomorphic / endomorphic / mesomorphic	

1. Anaemia	Yes/No
2. Cyanosis	Yes/No
3. Clubbing	Yes/No
4. Koilonychia	Yes/No
5. Urticaria	Yes/No
6. Lymphadnopathy	Yes/No
7. Jaundice	Yes/No
8. Skin pigmentation	Yes/No
9. Skin eruption	Yes/No
10. Obesity	Yes/No
11. Wasting	Yes/No
12. Any deformation	Yes/No
13. Swelling	Yes/No
14. Resp. rate/ min, regular/irregular	
15. Pulse	
16. B.P.	
17. Body Weight.	

Head and neck:

Nose	Watering	Swelling	Redness
Eyes	Watering	Swelling	Redness
Throat	Congestion	Enlarged tonsils	
Teeth	Healthy	Unhealthy	
Mouth	Healthy	Unhealthy	
Ears	Healthy	Unhealthy	

Respiratory systems:

C.V.S.	Normal		
	Abnormal findings		
Abdomen	Spleen	Palpable	Not palpable
	Liver	Palpable	Not palpable
	Colon	Normal / Palpable / Tender	
	Any abnormalities		
Skin	Rash	Yes/No	
	Urticaria	Yes/No	
	Itching marks	Yes/No	

Remarks:
Diagnosis:

Annexure III
INVESTIGATIONS

1. Blood

TLC		/cu.mm.	
DLC		P L E M B	
Hb		gm%	
Absolute eosinophil		count	
ESR			

2. Stool

	Cyst	Positive	Negative
	Ova	Positive	Negative

3. Sputum

Eosinophils	Positive	Negative
Polymorphs	Positive	Negative
A.F.B.	Positive	Negative
Sec. organisms	Positive	Negative
Charcoal laden crystals	Positive	Negative
Chushmann's spirals	Positive	Negative

4. Urine
5. X-ray

Chest	Positive	Negative
Sinuses	Positive	Negative

6. E.C.G.
7. Breath holding time
8. Spirometry

Annexure IV

List of drugs mentioned effective by Islamic physicians in cases of bronchial asthma[3,4,5,6]

Vernacular Names	Botanical Names
Yabrooj	*Atropa belladona*
Kharbaq	*Veratum album*
Shahm Hanzal	*Citrullus colocynthus*
Zoofa	*Nepeta ciliars*
Isra	*Iris ensata*
Mustard	*Brassica juncea*
Bhang	*Cannabis sativa*
Hulba	*Trigonella foenum*
Alsi	*Linum usitatissinum*
Kharanjwa	*Caesalpinia bonducella*
Pilas	*Butea frondosa*
Sosan	*Iris florentina*
Aneesoon	*Pimpinella anisum*
Satar farsi	*Zataria multiflora*
Afiyun	*Papaver somniferum*

Annexure V

Follow-up (During Treatment)

	15 days	30 days	45 days	60 days	75 days	90 days
Examination						
Blood						
Stool						
Sputum						
Urine						
X-ray						
Breathing Time						
Spirometry						

History and Symptoms

1. Did you have any attack Yes No
2. Severity of attack
3. Frequency of attack
4. Regularity of taking medicine
5. Duration of attack

Follow-up (Observation period)

	3 Months	6 Months	9 Months	12 Months
Examination				
Blood				
Stood				
Sputum				
Urine				
X-ray				
E.C.G.				
Breathing Time				
Spirometry				
History and Symptoms				
Attacks				
Freuency				
Severity				